South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde
P.O. Box 643, Cape Town Posbus 643, Kaapstad

Cape Town, 20 August 1955 Vol. 29 No. 34 Kaapstad, 20 Augustus 1955
Weekly 2s. 6d. Weekliks 2s. 6d.

PORPHYRIA IN THE BANTU RACES ON THE WITWATERSRAND

H. D. BARNES, M.Sc., A.R.I.C.

Biochemical Department, South African Institute for Medical Research, Johannesburg

The high incidence of porphyria in the Union of South Africa has been well recognized for some years and several reports have already been published.[1-9a] Whilst many cases of the acute form of this disease have been encountered amongst Europeans in South Africa this form seems to be comparatively rare in the non-European population. The great majority of the cases seen in non-Europeans show the skin lesions characteristic of delayed cutaneous porphyria. Most of ours have been found in patients in hospitals in the Witwatersrand area near Johannesburg and this résumé is presented to draw attention to our findings. It is hoped that others who see large numbers of Native patients will collaborate by sending specimens of urine and faeces from suspected cases so that more can be learned about the distribution of this malady.

About 6 years ago we began systematic spectroscopic examination of specimens of urine sent for routine tests which looked rather dark in colour even though the appearance was not typically 'port-wine'. Quite a number of these were found to contain porphyrin. The patients usually showed skin lesions, which will be described later; and, in a short while, clinicians began to recognize the picture and to send urine to be examined specifically for porphyrin. To date nearly 300 non-European cases (mostly Bantu) have been found in whose urine it has been possible to demonstrate porphyrin by direct spectroscopic examination. The records of 113 of these have been reviewed in the following analysis.

Sex. The females numbered 82 and the males 31. This finding is contrary to that usually reported for porphyria with cutaneous manifestations. Turner and Obermayer[10] found 56 males and 23 females in a series collected from the literature, some of which were cases of congenital porphyria whilst others had only noted the onset of symptoms in adult life. Watson[11] records 4 females to 19 males in a group designated as porphyria cutanea tarda. Bolgert *et al.*[12] describe 7 males and 2 females. Dean and Barnes[13] in a study of the inheritance of porphyria in a South African family of European ancestry found the skin lesions more pronounced in males and acute symptoms rare, whilst the females frequently suffered acute attacks and cutaneous symptoms were mild and sometimes absent. The preponderance of females in the present series cannot be explained by a preponderant attendance of females at the hospitals; the hospital figures indicate that male attendances outnumber female.

Age. The ages of the patients as given or estimated by the medical officer at the time when porphyrin was detected are tabulated (Table I). These do not necessarily indicate the age at onset of the disorder, since the lesions were sometimes stated to have been present for months or even years, and the patients often came to hospital for reasons other than the symptoms of porphyria.

TABLE I. CLASSIFICATION BY AGE

Age	*No.*	*Age*	*No.*
5 years	1	45–49	15
15–19	1	50–54	11
20–24	5	55–59	1
25–29	9	60–64	2
30–34	17	65–69	2
35–39	20	70–74	1
40–44	21		
			106

It seems not unreasonable to conclude from these findings that the disorder is not prevalent until adolescence and that its incidence increases at adult ages up to middle life.

Tribes. The patients were drawn from the Native communities which have gathered over the past 50 years on the Witwatersrand, but do not include any of the contract labourers in the mining industry. Table II shows the tribal distribution.

TABLE II. TRIBAL DISTRIBUTION

Msutu (Transvaal and Basutoland)	23
BaChwana (Western Transvaal and Bechuanaland)	4
Bapedi	2
Zulu	21
Swazi	11
Xosa	15
Other Kaffrarian tribes	3
Shangaan and Ndebele	4
Coloured	9
	92

These tribes have their homes in a wide area of South Africa extending southwards from North-Eastern Transvaal through Swaziland, Zululand, Natal and Eastern Cape Province. Others are from Basutoland and Southern Transvaal and the Bechuanaland Protectorate. The records do not state how long the affected individuals had lived in an urban environment; some of the younger patients had never lived elsewhere.

Major Complaint. As might be expected the complaints of these patients were many and varied and difficult to classify. About one-third of them sought advice because of skin lesions which, in most instances, were characteristic and probably related to porphyria. Others were troubled by pain in the abdomen, chest or extremities which may or may not have been so connected but, in many instances, the reason for attendance bore no relation whatever to porphyria, e.g. swollen glands, traumatic injury, pregnancy, etc. The latter group of cases serves to show that this disorder may exist in mild degrees causing no disability and its recognition is dependent on awareness of the condition by the clinician.

TABLE III. PROVISIONAL DIAGNOSIS

Pellagra	25	Malnutrition	2
Porphyria	20	Confinement	2
Epidermolysis bullosa	5	Dermatitis herpetiformis	1
Liver disease	5	Avitaminosis	1
Congestive cardiac failure	4	Asthma	1
Typhoid fever	4	Haemoglobinuria	1
Hydroa aestivale	2	Burns	1
Pemphigus	2	Tuberculous adenitis	1
Hypertension	2	Pleural effusion	1
Psychoneurosis	2	Granuloma	1
Acute alcoholism	2	Hydronephrosis	1
Meningitis	2	Empyema	1
Addison's disease	2	Hyperthecosis	1
Pneumonia	2	Menorrhagia	1
			95

In Table III are recorded the diagnoses made after the history had been taken and the clinical examination completed. The high position held by pellagra indicates the confusion which can arise about the significance of skin lesions on the sun-exposed parts, and suggests the need to exclude cutaneous porphyria in the differential diagnosis of pellagra, which is not infrequently suspected in Natives. Many specimens received from suspected pellagrins were found to be negative for porphyrin. It is recalled in this connection that many years ago Beckh *et al.*[14] suggested a simple test on urine for 'porphyrin' as being of value in suspected pellagra. Their findings were questioned by Watson[15] and Rimington and Leitner,[16] who showed by more critical methods that porphyrin excretion was not increased in pellagra. In a community in which pellagra and porphyria co-exist the two conditions can well be confused unless urine examinations are made.

The association of lesions described as epidermolysis bullosa and hydroa aestivale with porphyria is well recognized; porphyria should also be excluded in the differential diagnosis of other bullous dermatoses.

Alcohol. Considerable emphasis has been placed by Brunsting and Mason[17] on chronic alcoholism as a factor in the development of cutaneous porphyria. The Natives under consideration are legally restricted to slightly fermented beers prepared and sold under municipal control. Other drink, however, home-brewed in secret or smuggled from the normal market, is obtainable, at relatively high prices and often adulterated with toxic substances. About half of the patients were questioned and the majority admitted the consumption of alcohol, but not all of these could be regarded as heavy drinkers.

Skin Lesions. The typical sequence of skin lesions (Figs. 1-5) in cutaneous porphyria is the formation of bullae on the parts exposed to sunshine, though sometimes there is a history of their following mild trauma. These bullae may vary in size from a millimetre or two to several centimetres. The fluid is usually clear but sometimes red or brown; porphyrin has occasionally

Fig. 1. Bullae and scars on dorsal surface of hands. *Fig.* 2. Hypertrichosis. *Fig.* 3. Hyperkeratosis over knuckles. Bullae, crusts and depigmented scars.

Fig. 4. Hyperpigmentation of face, hypertrichosis; scars and small bullae on hand.

been detected in it but only in small amount. When the blisters break the ulcers are usually a long time healing and though the scar is sometimes insignificant it can, as a rule, be seen for a long time as a patch or annulus of hyperpigmentation. The new skin may show 'tissue paper' atrophy but occasionally extensive fibrous scarring, probably the consequence of secondary infection, has been seen. The skin is often inelastic but the scleroderma-like thickening and contraction and the mutilation of the nose and ears described in long-standing congenital porphyria are not seen. Marshall[4] regards hyperkeratosis over the exterior surfaces of the articulations of the fingers as significant, especially when associated with bullous lesions.

A generalized hyperpigmentation of the face and hands is sometimes marked and occasionally was given as the main reason for seeking advice. Hypertrichosis, often curiously limited to the temporal and pre-auricular regions, is not uncommon and very striking when present in females. Boshoff[18] has described the ocular lesions observed in many cases.

It is not, of course, suggested that all similar cutaneous lesions have a porphyric basis. The rash of pellagra, syphilitic ulcers, common traumatic ulcers, and many other skin lesions, may be present without excess porphyrin in the urine.

Skin lesions of the kind described were present in the great majority of the cases in this group; in only 8 records was it specifically stated that none was present. Of these, 2 were cases of acute porphyria, in which skin lesions are frequently not present, and one an obstetric case. In the remainder only slight traces of porphyrin were detected, and 4 of these showed indications of liver disease, the relationship of which to porphyrinuria is discussed later.

Serology. The results of serological tests for syphilis were recorded in 66 cases, of these 38 were positive and 28 negative. This proportion of positives is high and may possibly be due to failure to transcribe some of the negative reports to the patient's card or bedletter. Some patients were referred for anti-syphilitic treatment, the records of which were kept elsewhere and not followed up.

There were not many references to syphilis in the records but several physicians have remarked that the ulcers present in cases of porphyria resembled syphilitic ulcers. This gives the hint that urine should be examined

Fig. 5. Coloured woman with lesions on face, neck and arm. Her sister was similarly affected.

for porphyria in a case in which ulcers have not responded to treatment.

Liver Disease. It is well known that disturbances of liver function are widespread amongst the Bantu races in South Africa, and nutritional deficiencies in infancy have been suggested as the probable cause. Abnormal liver function and even frank jaundice have been reported together with porphyria in a number of cases in the literature. In 49 of the cases included in this analysis the urine which contained porphyrin also contained an excess of urobilin. Clinical assessments of liver enlargement are given in Table IV. The association of increased porphyrin excretion with diseases likely to involve the liver was observed by Garrod[19] before 1900. This has been repeatedly confirmed and recent work has shown that the amount only rarely exceeds about 800 micrograms per 24 hours of coproporphyrin and is, at least in part, explained by diversion of the porphyrin usually excreted *via* the gut. Increases in urinary porphyrin of this order would not readily be detected by direct spectroscopic examination. It is, however, possible that some of the cases reported as showing faint traces of porphyrin could have been the result of liver disease.

TABLE IV. LIVER ENLARGEMENT

Not palpable	32	2 fingers	9
Doubtful enlargement	3	3 fingers	7
Enlarged	4	4 fingers	4
1 finger	8	5 fingers	2
			69

Nutritional Status. This was not often recorded in the notes but the information given (e.g. emaciation, obesity, or nutrition poor, fair or good) does not suggest any correlation with porphyria.

Familial Incidence. The occurrence of porphyria in more than one member of a family has frequently been reported. It is generally considered that the rare congenital form is inherited as a recessive and acute porphyria as a dominant characteristic. Dean and Barnes[11] report a South African family of European ancestry containing 60 porphyric members, in which the inheritance conforms closely with the expectation according to simple mendelian dominance. It is not easy to carry out complete investigations of Bantu families and in the present series only 2 instances of familial occurrence have been encountered. In one, 2 sisters with skin lesions and porphyrin in the urine were admitted to hospital and a third sister who was symptom-free at the time passed urine containing porphyrin. At another hospital a male had lesions and porphyrin in his urine and a sister who was later admitted for her confinement had porphyrin in her urine but no skin lesions.

SUMMARY

The incidence of porphyria is studied in an urbanized community of South African Bantu in the industrial area around Johannesburg.

The patients, predominantly females, nearly all showed cutaneous lesions developing at adult ages. The acute form of the disease was uncommon.

The affection is by no means rare in this non-European community and a plea is made for a search for cases in other parts of the Union and in Africa generally.

As the proofs of this article were being corrected, information was received from Dr. John Leeming of Durban that cutaneous porphyria is frequently seen in Bantu patients in the clinic at the King Edward Hospital.

I have to thank the Superintendents of the Boksburg-Benoni, Edenvale, Coronationville and Baragwanath Hospitals for permission to abstract the case records. The photographs reproduced in Figs. 1-4 were supplied by Dr. James Marshall, and that in Fig. 5 by Mr. Theo. Marais, Department of Medicine, University of Pretoria.

REFERENCES

1. Barnes, H. D. (1945): Clin. Proc., Cape Town, **4**, 269.
2. *Idem.* (1951): S. Afr. J. Clin. Sci., **2**, 117.
3. Findlay, G. H. and Barnes, H. D. (1950): Lancet, **2**, 846.
4. Barnes, H. D. and Marshall, J. (1952): Ann. Derm. Syph. (Paris), **79**, 521.
5. Woods, J. D. and Barnes, H. D. (1951): S. Afr. Med. J., **25**, 952.
6. Perold, S. F. (1953): *Oor Porfirie en Verhoogde Porfirien Uitskeiding by Blankes en Bantoestamme in Suidelike Afrika.* M.D. Thesis, Univ. Pretoria.
7. Lang, R. and Walker, J. (1953): Brit. J. Derm., **65**, 352.
8. Kooy, F. H. (1939): S. Afr. Med. J., **13**, 720.
9. Dean, G. (1953): Brit. Med. J., **2**, 1291.
9a. Keet, P. W. J. (1952): S. Afr. Med. J., **26**, 493.
10. Turner, W. J. and Obermayer, M. E. (1938): Arch. Derm. Syph., N.Y., **37**, 549.
11. Watson, C. J. (1954): *In:* Dock, W. and Snapper, I., *eds.* Advanc. Intern. Med., **6**, 239.
12. Bolgert, M., Canivet, J. and le Sourd, M. (1953): Sem. Hôp. Paris, **29**, 1588.
13. Dean, G. and Barnes, H. D. In the press.
14. Beckh, W., Ellinger, P. and Spies, T. D. (1937): Quart. J. Med., **6**, 305.
15. Watson, C. J. (1938): Proc. Soc. Exp. Biol., **39**, 514, and (1939): **41**, 591.
16. Rimington, C. and Leitner, Z. A. (1945): Lancet, **2**, 494.
17. Brunsting, L. A. and Mason, H. L. (1949): Arch. Derm. Syph., N.Y., **60**, 66.
18. Barnes, H. D. and Boshoff, P. H. (1952): Arch. Ophthal., N.Y., **48**, 567.
19. Garrod, A. E. (1893): J. Path. Bact., **1**, 187.

MEMORIAL TO DOCTORS WHO GAVE THEIR LIVES IN THE SECOND WORLD WAR

The British Medical Association have published an *In Memoriam* brochure illustrating the Memorial erected in the Court of Honour at B.M.A. House, London, in honour of the medical men and women of the British Empire and Commonwealth of Nations who gave their lives in the Second World War.

In this Court there already stand the Gates of Remembrance in honour of those who fell in the 1914-18 War. The new Memorial, which consists of a Fountain and Statuary in Portland stone on an area paved in York stone, was designed and executed by Mr. James Woodford, *O.B.E.*, R.A., F.R.B.S., in collaboration with Mr. S. Rowland Pierce, F.R.I.B.A., Dist. T.B.

The four heroic-size figures set on pedestals around the Fountain symbolize the themes Sacrifice, Cure, Prevention, and Aspiration. They represent respectively Machaon (said to be a son of Aesculapius), a symbolic figure representing the post-Greek era of medicine, a figure of the period of Jenner, and an idealized representation of motherhood.

The memorial was dedicated by the Archbishop of Canterbury on 2 November 1954 at a ceremony in which those who took part included Sir John McNee (President), Dr. H. Guy Dain (Chairman of the War Memorial Committee) and Dr. E. A. Gregg (Chairman of Council).

The Roll of Honour comprises 546 names.

South African Medical Journal

Suid-Afrikaanse Tydskrif vir Geneeskunde

VAN DIE REDAKSIE

DIE CHEMOTERAPIE VAN KANKER

Die meganisme van kankerverwekking is al lank die onderwerp van intensiewe werk en intensiewe spekulasie. Dit is welbekend dat daar 'n groot aantal primêre verwekkers is wat deur hul werking op die lewende organisme goedaardige of kankeragtige abnormaliteite kan veroorsaak. Die algemene mening vandag is dat blootstelling aan sulke kankerverwekkende faktore, hetsy van inwendige òf uitwendige oorsprong, 'n somatiese mutasie van selle en 'n permanente verandering in hul metaboliese vermoëns in die hand kan werk. Die soektog na chemiese verskille tussen normale en abnormale weefsels het dusver slegs op kwantitatiewe verskille uitgeloop, hoofsaaklik met betrekking op waterinhoud en die inhoud van ensieme, metale, proteïene, nukleïensuur en fosfolipied. Bergel[1] het in 'n onlangse reeks artikels die chemiese aspekte van normale en abnormale groei bespreek. Hy het ook 'n oorsig gelewer oor die skeikunde van die vervaardiging van verbindings wat doeltreffend is by die behandeling van kwaadaardige gewasse.

‚Chemoterapie' by kwaadaardige siektes is nog maar baie jonk. 'n Groot struikelblok by die verwerk van doeltreffende sitotoksiese stowwe vir die bestryding van gewasse, is die feit dat die kwaadaardige selle in die gasheer se eie weefsel ontstaan. Die gewas behou dus grootliks die aard van die weefsel en toon veel minder selektiwiteit teenoor gifstowwe en teen-stofwisselingsprodukte as bakteriese of protosoïese selle. Daar is min moontlikheid dat één, besondere geneesmiddel vir kanker ontdek sal word want die benaming ‚kanker' behels nie net 'n *enkele* siekte nie; dit is 'n verdere rede vir die stadige vordering van die chemoterapie van kwaadaardige gewasse. Die ontdekking van stowwe wat by voorkeur met een of ander bestanddeel van gewas-selle sal reageer en sodoende hul sel-aktiwiteite sal belemmer, is meer belowend. Daar is 'n paar stowwe wat deur hul inwerking op die sitoplasma- of kernbestanddele van hierdie selle sulke gewenste resultate bewerkstellig. Hulle mag wees: ‚biologiese alkileringstowwe; teen-stofwisselingsprodukte (bv. merkaptopurien, aminopterien); plantprodukte (bv. aktinomisien C, podofillotoksien en kolchisien); hormone (soos die estrogene en androgene; diereprodukte (bv. sekere ensieme); en ioniserende straling, soos X-strale en radio-isotope.

Skeikundiges het reeds 'n groot aantal verbindings vir moontlike gebruik by kwaadaardige gewasse vervaardig. Hieronder tel die biologiese of sito-aktiewe alkilering-

EDITORIAL

CHEMOTHERAPY OF CANCER

The mechanism of carcinogenesis has for a long time been the subject of intensive work and intensive speculation. It is well known that a great number of primary agents can produce benign and cancerous abnormalities by their action on the living organism. It is currently believed that exposure to such carcinogenic factors, endogenous or exogenous, brings about somatic mutation of cells and a permanent change of their metabolic powers. In the search for chemical differences between normal and abnormal tissues only quantitative differences have so far been found; these have especially related to water content and to enzyme, metal, protein, nucleic acid, and phospholipid content. The chemical aspects of normal and abnormal growth have been considered in a recent series of articles by Bergel,[1] who also has reviewed the chemistry of the preparation of compounds effective in the treatment of malignant disease.

The 'chemotherapy' of malignant diseases is still in its infancy. One great difficulty in producing effective cytotoxic anti-tumour substances is the fact that malignant cells arise from the host's own tissue; the growth remains closely related to the tissue, and shows much less selectivity towards toxic agents and antimetabolites than do bacterial or protozoal cells. The possibility of finding a single cancer cure is remote since there is not just a single disease called cancer; this is another reason why chemotherapy of malignant disease makes slow advance. More hopeful is the finding of substances which will preferentially react with some constituent of tumour cells and damage their cellular activity. A number of agents produce some such desired effects by reaction with cytoplasmic or nuclear constituents of the cells. They may be 'biological alkylating agents'; antimetabolites, e.g. mercaptopurine, aminopterin; plant products, e.g. actinomycin C, podophyllotoxin, colchicine; hormones, e.g. oestrogens, androgens; animal products, e.g. certain enzymes; and ionizing radiations, namely X-rays and radio-isotopes.

Chemists have developed a large number of compounds for possible use in malignant disease. Among these are the biological or cyto-active alkylating agents.

stowwe. Navorsing gedurende die oorlog het tot die introduksie van die stikstofmosterds gelei. Dit was dan ook die grondslag vir die vervaardiging van ander verbindings wat, soos bv. in die geval van die halogeenbevattende mosterds, biologiese reaksies, op die basis van hul alkileringeienskappe, getoon het. Die fisies-chemiese aspekte van die reaksies word deur Bergel[1] voorgelê; hy meen dat die wisselwerking van nukleïensure vir die biologiese skade verantwoordelik is. Dit is egter nie seker watter wisselwerkings mees waarskynlik vir òf kankerwekking òf die bestryding van gewasse verantwoordelik is nie.

Doeltreffende chemoterapie op gebied van kwaadaardige weefsels word nog maar 'n paar jaar lank toegepas. Baie navorsing moet nog gedoen word, maar die vooruitsigte is belowend. Estrogeen hormone word vandag by kanker van die prostaat en bors gebruik; androgene by borskanker; stikstofmosterd (mustien) by limfkliergewas; myleran by murgleukemie en teen-stofwisselingsprodukte by akute leukemie. Moontlik is dit slegs 'n kwessie van tyd voordat 'n groter en doeltreffender verskeidenheid middels vir die behandeling van kwaadaardige gewasse beskikbaar word.

Verskeie gesaghebbendes uit Brittanje sal die onderwerp van kanker bespreek by geleentheid van die voltallige sitting van die Mediese Kongres wat in Oktober in Pretoria plaasvind. Prof. A. Haddow se lesing oor kankerverwekkende stowwe en hul praktiese belang sal, uit die chemoterapiese gesigspunt beskou, besonder interessant wees.

1. Bergel, F. (1955): J. Pharm. Pharmacol., **7**, 297.

War-time research led to the introduction of the nitrogen mustards. From this point other compounds were prepared which, like the halogen-containing mustards, were found to possess biological action on the basis of their alkylating properties. The physiocochemical aspects of the reactions are presented by Bergel,[1] who prefers the view that interaction with nucleic acids is the cause of biological damage. However, there is no certainty as to the most likely interactions responsible for anti-tumour or carcinogenic effects.

Effective chemotherapy in the malignant field is only a few years old. Much remains to be done but the prospects are not without brightness. At this time oestrogens are being used in carcinoma of the prostate and the breast, androgens for cancer of the breast, nitrogen mustard (mustine) for lymphadenoma, myleran for myeloid leukaemia, and antimetabolites for acute leukaemia. It is probably only a matter of time before a wider and more efficient selection of agents will be available for the treatment of malignant diseases.

The subject of cancer will be discussed by several authorities from Britain at a plenary session of the Medical Congress to be held in Pretoria in October. Of particular interest from the point of view of chemotherapy will be Prof. A. Haddow's address on carcinogenetic agents and their practical import.

1. Bergel, F. (1955): J. Pharm. Pharmacol., **7**, 297.

NOMINA ANATOMICA 1955

An event of importance to all branches of medical science took place towards the end of July in Paris, when the 6th International Congress of Anatomists met and the major business before the meeting was a new Nomina Anatomica which the Congress members were asked to approve. This provisional list of Latin terms was drawn up by the efforts of the International Anatomical Nomenclature Committee established by the 5th Congress, which met in Oxford in 1950. This committee is representative of all the European countries, of the British Commonwealth, and of both North and South America, and in the later stages of its work it also received the cooperation of the Japanese Anatomical Society. It can thus be said to represent virtually all anatomists except those behind the Iron Curtain—an invitation to the Anatomical Society of the U.S.S.R. was not accepted.

The history of attempts to rationalize anatomical nomenclature is an interesting one. Sixty years ago a group of anatomists, mostly German but with some others, made the first attempt; their vocabulary has become known as the Basle nomenclature (BNA, 1895). The principles on which they went to work were sound and in fact were adopted, almost unmodified, as the basis on which the recent Committee proceeded. Despite this the list had a mixed reception, especially in Germany. In English-speaking countries the opposition was undoubtedly aggravated by feelings engendered by the First World War. A British Revision (BR) was published in 1933 and a German one, known as JNA (after the city of Jena) in 1937. The American Society of Anatomists also prepared a revised list which, however, was never published. Neither of the published revisions received universal assent. JNA was widely used by German, Dutch, Scandinavian and Japanese anatomists, while BR was generally adopted in Commonwealth countries.

After the Second World War it was possible to think again of a new effort to get agreement. The general feeling among the anatomists who met at Oxford in 1950 was that a more conservative revision of the BNA ought to be aimed at, and the prospects for widespread agreement appeared to be good. The Committee charged with the preparation of the revised nomenclature divided the BNA into 7 parts and allotted each to a sub-committee of 3 members from 3 different countries in every case. In addition each of the 8 members of the Committee appealed through the medical press of their respective countries for suggestions and help from clinicians and other interested people. The response to this appeal is stated to have been disappointingly small. The lists prepared by the sub-committees were carefully considered by the whole Committee during a week's meeting in London last year,

and the final list was unanimously approved for submission to the 1955 International Congress.

This is not the place to discuss the details of the proposals, as they have yet to be formally published. It is, however, proper to remark on the success which anatomists all over the world have had in coming to an agreement amongst themselves, and to congratulate those who shouldered the arduous task of organizing the necessary meetings and correspondence. It has been fairly fashionable in clinical circles to scoff at the anatomists, unable to agree amongst themselves and with a new fancy terminology every 20 years. This attitude has perhaps excused a dogged adherence to an older, well-loved, often eponymous nomenclature which has been so common in the wards. This state of affairs is now at an end, and it will in future be the duty of pathologists, surgeons and physicians to make a conscious effort to get in step with the whole of the scientific anatomical world. The process may take time, but it is possible now to see on the horizon that much desired student's Utopia where the name he first learns for a structure is the only one he ever hears.

THE PLACE OF PHYSIOLOGY IN MEDICAL AND LAY EDUCATION*

ARCHIBALD W. SLOAN, M.D., B.Sc., M.R.C.P., F.R.F.P.S.G.

Professor of Physiology, University of Cape Town

On the occasion of a professorial inaugural lecture the new professor can express himself freely on his subject without the restrictions imposed by curricula and examinations. I propose to take advantage of this opportunity to express some personal views on science in general and on physiology in particular and to comment on the place of physiology in the medical curriculum and in the general education of a civilized community.

SCIENCE

Science, whether biological or other science, depends on observation, correlation of observations, and attempted prediction. We observe what has happened in the past and we attempt to predict what will happen in the future. The value of science to mankind depends on the accuracy of this prediction. The scientist's concept of truth is much more limited than that of the philosopher. Truth for the scientist is merely a concept of reality which agrees with experience; it need not have any ultimate goal or purpose, nor need it have moral values. In science a belief is true or untrue; it is not good or bad. And this truth is always provisional; it agrees with present experience but may not agree with more enlightened experience in the future.

A feature of scientific belief which is not widely appreciated is that, like religion, it depends on faith. Whitehead[1] affirmed that 'the faith in the possibility of science .... is an unconscious derivative from medieval theology'. The scientist's faith is in order and harmony. The laws of science depend on the assumption that the simplest explanation of phenomena is likely to be the nearest to the truth.

In dealing with the problems of human biology we cannot entirely dissociate the intellectual approach of science from the emotional and ethical approaches to the same problems. As scientists we are not directly concerned with moral and spiritual concepts but as human beings we are influenced by them and we must never underrate the importance of those aspects of truth to which science furnishes no key. 'It is as inept for a scientist to deny the existence of what he cannot measure as for a priest to denigrate the findings of science and encourage superstition. Each must be willing to recognize each other's values'.[2]

A modern French philosopher and scientist, Lecomte de Noüy,[3] illustrates with a neat metaphor the dangers which beset those whose belief is limited to what they can understand. He says: 'They reason somewhat like the greyhounds who, racing after a live rabbit in a field, suddenly stop, saying: "How stupid we are; this is not a real rabbit, he has no wheel" '.

Our understanding, even of science, is always limited and each advance opens up new fields for investigation. It should be a source of satisfaction to the scientist that there will always be more to discover.

BIOLOGY

In biology particularly we seem foredoomed to ignorance of many of the phenomena of life, and we are tempted to fall into the error of thinking we have explained something when all we have done is give it a name. For instance when we say that something is a vital phenomenon or due to vital activity we usually mean that it is a phenomenon whose cause we do not know but which appears to be peculiar to living creatures. We have not explained the phenomenon by calling it 'vital'.

Much biological activity is explicable nowadays on known physical and chemical laws but a hard core still remains and will probably always remain to be explained. Professor J. Arthur Thomson[4] expressed this idea very clearly. He said: 'There is a chemistry and there is a physics of the living creature, but if you add them together you do not get biology. For the living creature is an individuality, an agent that does things, a unity which has, often at least, a mind of its own. We cannot give a chemical account of behaviour or development or evolution. There is a chemistry of the organism, but the organism transcends chemistry'. According to Jennings[5] 'it is of the very greatest importance for the understanding of the behaviour of

*Inaugural lecture in the University of Cape Town, 27 April 1955

organisms to look upon them chiefly as something dynamic—as processes rather than as structures. An animal is something that happens'.

In this connection the close relationship of psychology with physiology becomes apparent. Physiology is concerned with the brain as the physical agent of mind whereas psychology studies the mind itself. An animal's behaviour cannot be adequately explained without some knowledge of both sciences.

PHYSIOLOGY

Now, without further general dissertation on the vast scope of biology I must return to the more limited field of physiology. As an introduction to some of the points to be considered let us see first what physiology means and how the meaning of the term has, in the course of time, become restricted. Physiology, from its original Greek derivation, meant the study of nature but, in the course of time, the term became restricted to the study of living organisms, plant or animal, which we now call general biology. By the early 17th century physiology had come to have its modern meaning, the study of the phenomena of life. The two great branches of biology had separated, morphology dealing with the structure, and physiology with the function of living things. In many ways this separation is most unfortunate, since knowledge of structure alone without an eye to function would be of little value, and understanding of function is impossible without some knowledge of structure; but, with the growth of information on every aspect of biology, it becomes impossible for one individual to have more than a superficial knowledge of other branches of natural science than his own.

We have then physiology in its modern sense as the science of the normal functions and phenomena of living things. There are the obvious subdivisions into plant and animal physiology, corresponding to the two kingdoms of living organisms. But the process of specialization does not stop there. We have (though not at Cape Town) biochemistry and, still more recently, biophysics separating off as independent disciplines, a separation sometimes justifiable on grounds of expediency but making it ever more difficult to study the living creature as an individual and not merely as a mass of chemical and physical reactions.

For reasons of convenience the Department of Physiology is concerned primarily with human physiology, whereas plant physiology is dealt with by the Department of Botany and the physiology of lower animals by the Department of Zoology. The studies of plant and of animal physiology overlap to some extent, particularly in dealing with the lowest forms of life, but the overlap of zoology and human physiology must necessarily be even greater. Although in the study of human physiology the ideal experimental animal is obviously man, we are morally obliged to avoid experiments, however useful and informative, which could harm a human being. Much information of fundamental importance to physiology and hence to medicine can only be obtained by experiments on lower animals, but we must of course be very guarded in assuming that the same processes occur in man.

At this point let me make a statement of faith in connection with animal experimentation. I believe that experiments on living animals, so-called vivisection, are fully justified, not only to obtain information of immediate and obvious value to the practice of medicine, but also to learn biological facts which in the present state of knowledge have no obviously useful application, and to teach the elements of biology to prospective scientists and doctors. I also believe that the performance of such experiments imposes on the operator a grave moral responsibility in the prevention or minimizing of suffering. The vast majority of physiological experiments are, of course, performed on animals rendered unconscious before the experiment starts and killed before consciousness is regained. Nothing but thoughtless sentiment can condemn this practice while condoning much less humane methods of killing animals for food and of destroying unwanted animals. On the very few occasions when a physiological experiment requires that the animal should be conscious at some stage, not only must the experimenter be constantly on the alert to minimize suffering but he must consider with great care whether the results he hopes to achieve could be obtained by any other form of experiment and, if not, whether they would in fact be sufficiently valuable to justify what he proposes to do. The end does not always justify the means.

In connection with human experiments I cannot do better than quote in translation from Claude Bernard's[6] magnificent book published 90 years ago, *An Introduction to the Study of Experimental Medicine:* 'Among the experiments that may be tried on man, those that can only harm are forbidden, those that are innocent are permissible, and those that may do good are obligatory'.

UNDERGRADUATE EDUCATION

We now come to my second main theme—the place of human physiology in the education of a medical student. Although a physiology department has usually many interests outside the medical curriculum, most physiology departments have as their main teaching commitment the biological training of potential doctors. I wish to dwell on this subject for a few minutes.

E. P. Cathcart, who was Professor of Physiology in Glasgow 20 years ago, used to tell his students that he would not stress the importance of the subject; if they had not the sense to see for themselves that the whole of medicine was founded on physiology he was not going to waste his time telling them so. Claude Bernard,[6] 70 years previously, was less inhibited; to quote again from his *Introduction:* 'The scientific basis of experimental medicine is physiology . . . . without it no medical science is possible'. Marey[7], another great French scientist of the 19th century, expressed a similar view. To translate from his book, *La Circulation du Sang:* 'Medicine is physiological; the phenomena of disease are not produced by special processes but only by disturbance of the processes which govern normal function'.

Physiology evolved from medicine. The primary concern of the physician has always been, as it should

be, to relieve suffering and to prolong the life of his patient but, in the early days of medicine, he did not seek the fundamental cause of his patient's trouble nor attempt a rational analysis of the methods employed in curing him. The replacement of empirical by scientific medicine has been a gradual process lasting many centuries and it is still far from complete. Although some physiological ideas are as old as medicine, physiology as a science is little more than a hundred years old.

The medical student comes to physiology with some basic training in physics and chemistry, botany and zoology. In the study of physics and chemistry he learns to expect a certain constancy of reaction in his experiments: ignite hydrogen in air and you get water, every time. Botany and zoology may have prepared him for the shock of human physiology, where prediction is much less simple. Indeed the response of any living organism to any particular set of circumstances shows great variability. Hebb[8] expressed this succintly by saying that if two puppies from the same litter are brought up in the same environment and exactly the same stimulus is applied to each, each will respond by doing just as it damn well likes. The fundamental lesson of physiology is the inconstancy of biological response, and the lesson must be learnt, since it applies to the whole of medical science.

When both mental and physical reactions are involved, as in Hebb's illustration, the variability of response is even greater than with either alone. The correlation of mental with physical activity is one of the most difficult as well as one of the most interesting aspects of physiology. Men have been seeking for thousands of years to explain it, with but little success. In recent years a whole new science, called cybernetics, has grown up, which attempts to explain the working of brain and mind on the basis of electronic circuits and high-speed digital computers. While the analogy is a useful one it has obvious limitations.

Some knowledge of the relationship of mind and body is of importance to the physician since so many physical diseases are attributable to mental disturbance and since physical disease itself so often affects personality. The whole modern concept of psychosomatic medicine depends on the abstruse relationship between body and mind. It becomes even more abstruse if we allow the theologian to intervene and postulate a soul. While we may be lured into these tempting byways of speculation, as scientists we must always be prepared to withdraw again within the limits of what we can confirm by observation and experiment.

The second-year medical student studies at the same time anatomy and physiology, the normal structure and the normal function of the body. This is an eminently reasonable programme but whether it leads to an integrated course in human biology or to hopeless confusion depends on the degree of cooperation between the two departments, both in planning their courses and in the matter taught.

Probably the main difficulty the student encounters in learning physiology is due to the complex integration of the several parts of the body. Until one has studied all the tissues and organs of the human body it is difficult to understand the working of any one of them. It is unfortunate that limitations of time often prohibit an adequate introductory course before the details of the several systems are studied. This limitation affects particularly the few medical schools, including that of Cape Town, in which the course in physiology is limited to one year. It is difficult in this time to give the student sufficient theoretical instruction in general and systematic physiology and adequate practical training in the methods of histology, experimental physiology, and biochemistry.

Since physiological knowledge is founded on experiment it is of the utmost importance that all students of physiology should perform experiments and should learn the discipline of experimental technique. A junior student need not perform difficult or complicated experiments but the mere fact of gaining knowledge from his own observation of controlled phenomena will give him insight into how all the scientific information he is taught was obtained. To teach an experimental science without experiments is like teaching a language without grammar.

The ideal of physiological as of any scientific teaching was well expressed by Gerarde[9] more than 350 years ago: 'that which I have seen with mine eyes, and handled with mine hands, I dare confidently avouch and boldly put down for verity'. Unfortunately, life is too short for us to repeat all the experiments on which our teaching is based and we must take much information on trust, but this trust must be a critical one, not akin to credulity. Wherever possible we must seek experimental evidence for ourselves, particularly where previous work leaves obvious room for doubt. William Hunter's reply[10] to Jenner's request for information is still good advice today: 'Why think, why not try the experiment?'

Apart from repetition of set experiments, the concept of research, of finding out something new, should always be in the foreground. The staff of a physiology department should be actively engaged in research, and I think it preferable that each member should follow his individual bent rather than that the greater part of the work should be done as a team. It is certainly to the student's advantage that his teachers should have a variety of interes: and that the specialized knowledge of all should not be limited to the same field of investigation.

The medical student is unfortunate from the point of view of research in having to assimilate a vast amount of detailed information in a limited time. Time does not usually permit him to undertake original investigations during his undergraduate career. This makes it doubly important that his teachers should be active research workers so that the intellectual climate in which he is trained is one of research. Scholasticism must be avoided at all costs; the atmosphere should be one in which past and present knowledge is questioned, tested and criticized and new knowledge is sought. Cardinal Newman[11] said that a university should train the mind, not necessarily to solve immediate problems but to develop mental powers for intellectual problems still unknown. I entirely agree with this opinion.

Science students are in a happier situation than the medicals in being allowed more time for reflection. A

training not only in the appropriate branch of science but also in the theory and practice of research is an essential part of any scientific training. A welcome innovation in some universities in recent years is a short course in the history and philosophy of science, offered by historians and philosophers competent to deal adequately with the subject. By stressing this aspect of scientific training we may avoid the reproach that we are merely training technicians, not scientists.

PATHOLOGY AND MEDICINE

From physiology the medical student proceeds to pathology, from the study of the normal to the study of the damaged and disordered. A pathologist would no doubt support me if I were to say that pathology rather than physiology is the basis of medicine since it is diseased, not healthy, organs which require medical or surgical treatment, but I feel sure he would agree with the further contention that a good pathologist must build on a sound foundation of physiology. A pathologist cannot recognize a disorder of structure or of function unless he knows the various manifestations of the normal.

One of the most difficult problems of physiology and pathology, as of medicine, is to define the limits of normality. There is such variation in living creatures! The normal atomic weight of oxygen is 16 and the normal acceleration due to gravity is 32 feet per second per second but what is the normal height of a man or of a woman? What is the normal rate of the beating human heart? How much air normally passes in and out of the lungs at each breath? In all these physiological measurements there is a wide range of normal. We may express this range by taking a group of healthy individuals and finding the average measurement and the range from largest to smallest. Further, we can invoke the aid of statistics in finding the standard deviation and the range within which an arbitrary proportion of subsequent readings may be expected to fall. But even statistical analysis cannot predict with accuracy what the findings for any particular individual will be.

From pathology the student proceeds to the study of medicine, surgery and midwifery in all their manifold aspects. The physician or surgeon has the grave responsibility not only of recognizing deviations from the normal but of deciding, when these have been recognized, whether treatment is indicated and, if so, what treatment is likely to be effective. His preliminary training in the medical sciences is all designed to fit him for this work but should also have the wider purpose of teaching him the careful and critical method of science, which he should apply to his clinical problems.

EXTRAMURAL EDUCATION

The other main theme I wish to sustain is the place of physiology in general, as distinct from medical, education. Any human culture or civilization depends on man, the unit of the system, and must work within the limitations imposed by the nature of man. A civilization which attempts to ignore the basic principles of human physiology and psychology is bound to perish.

Since physiology is so fundamental I believe that it should be widely taught, not only for its practical value in teaching the rudiments of hygiene, but also as an introduction to the wonderful complexity of living creatures. From the practical point of view physiology is of the greatest importance. Just as a motor mechanic studies the mechanism of the cars he must work with and a radio engineer the circuits of the sets he handles, so it is reasonable for a human being to study the mechanism of his own body in order to maintain it in good repair and to work it efficiently.

But apart from the purely practical value of physiology it has a much wider cultural value as an intellectual discipline. 'The proper study of mankind is man'[12] and this study is at least as valuable in training the mind as is the study of man's achievements in the fields of art, music, and literature. Even an elementary understanding of the world of life in and around us makes living a much richer experience.

I think biology, including the principles of human physiology, should be taught to school children and that adult classes should be available in any community which boasts a medical school, to teach people who want to know more about the working of the body, not necessarily for any vocational end but as an intellectual exercise.

I have expressed a personal opinion on why physiology should be taught, and to whom. With school children, of course, it is of fundamental importance to teach the love of science rather than the bare bones of any scientific subject. The details of chemistry, physics, geology, or biology can be learnt at any time and, if the child's interest is aroused, he will learn these details. The habit of scientific thinking should be started early, certainly not later than the study of foreign languages.

At school, children can be given individual research projects to carry out and as homework they can prepare reports of their observations. Subjects like geology and biology lend themselves to field study, and this should be encouraged. The children may also visit museums, research stations, university departments, and technical colleges, in order to see scientific work in progress. Public lectures to children on various aspects of science are a service which can usefully be undertaken, among their other activities, by the senior scientific societies.

Extramural classes in science for adult students should always include practical work carried out in the laboratory under the teacher's supervision. The student is taught to observe, to record his observations, and to draw conclusions from them. Such a training in the method of science is more interesting as well as more valuable to the student than the details of the particular scientific subject he is studying, and I have found great enthusiasm for this practical work in extramural classes which I have taught. It may even be possible to grant laboratory facilities to the keenest students to carry out particular investigations which appeal to them. Biological science owes a great deal to the enthusiastic amateur and he should be guided and encouraged wherever possible by the professional.

METHODS OF TEACHING

Finally, how should we teach? I believe that the formal lecture, far from being obsolete, is a very useful method of teaching. It should be used, not to replace textbooks, but to bring the subject matter up to date and to bring it to life. The tutorial system, which prevails in the Universities of Oxford and Cambridge, may be even better, but it requires a very large teaching staff. In universities which lack the tremendous resources of these ancient foundations the tutorial system is not practicable.

A lecture may be supplemented in various ways. Since physiology is a living science it is best illustrated by living demonstrations, but there is a place also for graphic illustrations of the form and function of the parts of the body, and the teaching film is rightly becoming popular as an additional means of demonstrating function. Many vital processes involve movement of one sort or another, and this movement can be clearly shown by the cinematograph.

I have already stressed the importance of practical experience in laboratory technique.

As an expression of the principle underlying the teaching of science I cannot do better than quote Claude Bernard[6] once again, since it is the best advice I know. To translate: 'I think a teacher's role should be limited to clearly showing his pupil the goal that a science sets itself and to pointing out all possible means at his disposal for reaching it. But a teacher should then leave his pupil free to move about in his own way and, according to his own nature, to reach his goal, only coming to his aid if he sees that he is going astray'.

REFERENCES

1. Whitehead, A. N. (1953): *Science and the Modern World*, p. 16. Cambridge: University Press.
2. *Editorial* (1951): Lancet, **2**, 671.
3. Noüy, L. de (1947): *Human Destiny*, p. 149. London: Longmans, Green & Co.
4. Thomson, J. A. (1939): *Biology for Everyman*, p. 915. London: Dent & Sons.
5. Jennings, H. S. *Quoted by* Bayliss, W. M. (1920): *Principles of General Physiology*, p. xv. London: Longmans, Green & Co.
6. Bernard, C. (1865): English translation by Greene, H. L. (1949): *An Introduction to the Study of Experimental Medicine*. Pp. 102, 198, 226. New York: Macmillan Co.
7. Marey, E. J. (1881): *La Circulation du Sang*, p. 545. Paris: Masson.
8. Hebb, D. O. (1952): *The Physiological Problem of Learning*, Public lecture delivered in Univ. Glasgow, 20 May.
9. Gerarde, J. (1597): *The Herball*, p. 1392. London: John Norton.
10. Hunter, W. (1775): Letter to Edward Jenner, *Quoted by* Baron, J. (1827): *The Life of Edward Jenner*, p. 33. London: Henry Colburn.
11. Newman, H. *Quoted by* Himsworth, H. P. (1951): Lancet, **2**, 743.
12. Pope, A. (1734): *An Essay on Man*, Epistle II, line 2.

SOME ASPECTS OF TUBERCULOSIS IN ONTARIO, CANADA*

ALFRED C. RONALD, M.B., CH.B. (CAPE TOWN), M.R.C.P.

Cape Town

The management of tuberculosis is still a world-wide problem, though in some parts of the world the situation has improved greatly in recent decades. Some of the experience and impressions gained in this field during a stay of one year in Canada may be of interest.

Canada belongs to that group of countries in which pulmonary and other forms of tuberculosis are relatively well controlled, where sanatorium care and beds are available for all known and new cases as they are discovered, and where public-health officials are exercized more by the problems arising from this firm control than by the epidemiological problems and relatively insufficient facilities that obtain in less fortunate areas.

PREVALENCE

The tuberculosis mortality varies in the different Canadian provinces, the average being 10·3 per 100,000 population. In Ontario the figure is 6·1. This is among the lowest rates in the world and reflects the efficacy of the therapeutic measures, while the absence of any marked fall in the morbidity rate may be taken as an index of energetic case finding. Despite the recent rapid increase in Canada's population the shortened waiting lists and, in some sanatoria, the empty beds give good evidence of the progress established and maintained in combating tuberculosis.

New difficulties now arise. Mortality rates as low as those mentioned above are poor yardsticks with which to measure any change in the state of public health with respect to tuberculosis, and furthermore they are slow to reflect the effectiveness of new measures of control. In Ontario 2,500 to 3,000 routine X-ray films in non-selective community surveys are scrutinized for every new case with active pulmonary disease found by this means, an incidence of 0·04% (the South African figure amongst rural non-Europeans is 0·78%). The incidence may be expected to fall further with improving control, so that one may visualize a point where it ceases to be economical to base tuberculous case-finding on chest X-ray or on X-ray as the first step in the programme.

BCG vaccination as a prophylactic measure is not in vogue in Ontario. It is used where exposure to tuberculosis is certain or likely, e.g. in medical students and nurses, and in children with negative Mantoux skin tests who are contacts of newly-discovered cases, etc. Children moving from Ontario to other areas where the chances of exposure are much higher make suitable subjects for BCG vaccination. A positive

* Written while the author was at Toronto Hospital for Tuberculosis, Weston, Ontario.

intracutaneous Mantoux test becomes an ever more important diagnostic aid in a community in which the incidence of tuberculosis infection is falling and where, in consequence, the average age of first exposure is higher than in countries where pulmonary tuberculosis is more prevalent. In Ontario a situation has been reached where the drawback entailed in the loss of anergy—as reflected by a positive Mantoux test—cannot offset the relative immunity, probably transient to boot, artificially induced by BCG, at however small a risk. The incidence in urban areas of positive intracutaneous Mantoux tests (0·05 mg. O.T.) is 10% at the age of 15 years, 20% at 20 and 50% at 35[1]—it is less in rural districts. As comparison, an incidence of 19% in children between 6 months and 4 years is reported in urban areas of South Africa, with correspondingly elevated figures in the older age-groups.

With an ever smaller number of open cases remaining undiscovered there is a lessened risk of exposure, so that primary-type tuberculous disease is seen on the average at an older age than some decades ago or, e.g., in South Africa at the present time. Another interesting trend with respect to age is the increase in the percentage of patients in sanatoria who are beyond middle age—largely males—and this trend carries with it an increase in the concomitant diseases of aging.

TREATMENT

Only a brief review of this can be given. Although on the whole there is a similarity in anti-tuberculosis treatment, details vary in different centres.

Rest has perhaps become less important since it is no longer the only recourse available, but it still forms part of the therapeutic regimen. The amount of bed rest required is directly dependent upon the assessment of the extent of the disease. It is graduated so that there is no sudden demand made upon the patient's physical resources when he leaves the sanatorium.

The proponents of two-drug therapy are still busily defending themselves against the view that the simultaneous use of three, viz. streptomycin, para-aminosalicylic acid (PAS) and isoniazid (INH) brings better results over a long period. The duration of chemotherapy is also rather variable; on the whole it is longer in Canada and the United States than in England or South Africa. At the Toronto Hospital for Tuberculosis these 3 drugs are given concurrently over not less than 12 months for minimal pulmonary disease (or pleural effusion) with or without the presence of the tubercle bacillus. Cases of more advanced disease receive longer treatment. Periods of therapy of 18-24 months are not exceptional; the average duration of drug therapy in sanatorium is 15 months. It may be argued that it is useful to have a drug in reserve should resistance develop, but it appears that there is less frequent drug-resistance when streptomycin, PAS and INH are used together. In a review conducted at this hospital recently Capon[2] showed that at the end of 6 months of therapy, whereas 35 out of 66 patients in the two-drug group showed cavity closure (53%), in the three-drug group 34 out of 53 patients showed cavity closure (64%). Of the 19 patients who still showed open cavities at

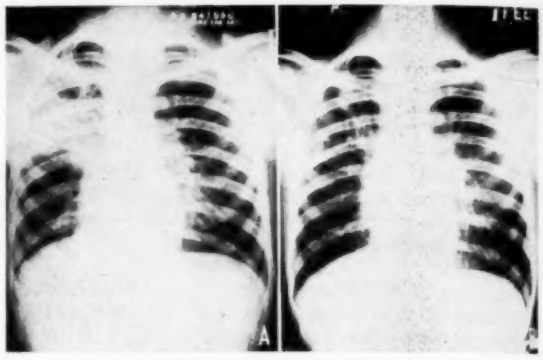


Fig. 1. White male aged 21; (A) before and (B) after 9 months' Three-drug therapy.

6 months, 9 showed cavity closure after 12 months of three-drug treatment, a total closure rate of 81%.[3] The three-drug therapy led to a sputum-conversion rate of 93·6% in 166 consecutive patients admitted to the hospital for primary treatment from January to June 1954. In those patients who had had previous treatment at any time the conversion rate was 71·5% (Fig. 1).

Additional drugs used in special circumstances are pyrazinamide, viomycin and terramycin. Cycloserine is still in the experimental stage in the United States and is not yet commercially available.

Isoniazid is given at a dosage of 300 mg. daily for the average adult, and in correspondingly smaller doses for children, but increased in tuberculous meningitis to 8-10 mg. per kg. body-weight at the commencement of therapy. Since its routine use began no case of tuberculous meningitis has been known to develop during the treatment of patients in this hospital. INH is by no means an innocuous drug and I have seen toxic effects from it, varying from mild tingling in the extremities to an acute psychosis. Skin rashes, sometimes, though rarely, associated with changes in the blood picture which may resemble those of infectious mononucleosis, have also been seen.

PAS. The dosage employed in this sanatorium is 10g. (14 g. of sodium PAS) per day for adult patients. The drug is given in divided doses, and is available in several forms. Most patients are able to tolerate this relatively large amount without impairment of appetite or other side-effects. PAS is a valauble addition to anti-tuberculosis therapy—not merely because of its property of delaying streptomycin resistance.

Streptomycin is given by the injection of 1 g. twice weekly; the calcium chloride complex is in common use. The injection of combined forms of streptomycin is not recommended. On a long-term basis, 2 g. per week combined with PAS and INH has given results at least as good as may be expected from its more frequent administration and in a larger total dose.

Streptomycin sulphate (Glaxo) has recently been introduced. This preparation is available in stable solution at a cost only slightly in excess of the more familiar streptomycin preparations. This solution

carries the advantage that it is ready for injection, thus reducing the demand on the time of nursing staffs; of even greater importance is that it entails less exposure to streptomycin and less risk of contact dermatitis and other forms of drug sensitivity. Its advantage in domiciliary treatment is obvious. Injections of streptomycin sulphate also appear to be less painful.

Pyrazinamide, 40 mg. per kg. body-weight per day in 3 divided doses orally, may be used alone or in combination with other chemotherapeutic agents. Its main value is in preventing spread of disease during and after operation in those few cases where resistance to the more commonly used drugs has developed. The brunt of the toxic side-reactions, where they occur, falls upon the liver, and close clinical and laboratory supervision is required during its use.

Collapse therapy has fallen completely out of favour on the continent of North America. In this sanatorium of 656 beds no artificial pneumothorax induction has been attempted since 1952. Pneumoperitoneum is still employed, sometimes to assist chemotherapy in extensive bilateral cavitatory disease, but more often in conjunction with surgical procedures to help obliterate residual pneumothorax, e.g. after resection or decortication operations.

Surgical resection is by far the most frequently performed operation for pulmonary tuberculosis at present. Its indication, stated shortly, is for those lesions which have responded inadequately to drug therapy after a reasonable period of 6-9 months. With increasing surgical skill and experience, the introduction and use of INH, and prolonged chemotherapy, less lung tissue is being removed; lobectomies are yielding to segmental resection, and wedge resections for solitary tuberculoma are performed more frequently year by year.

Decortication for incarcerated lung, whether after effusion or pneumothorax therapy with poor re-expansion, is a rewarding operation. It is performed sometimes within a few months after the onset of pleurisy where resolution has failed despite correct treatment, and where fibrothorax and not rarely scoliosis are complicating the picture (Fig. 2). At this hospital 48 of these operations have been performed since 1947. With 3 exceptions the results have been satisfactory.

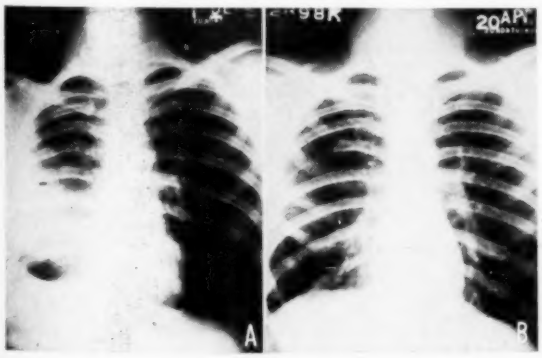


Fig. 2. White male aged 19 years; fibrothorax (A) before and (B) 4½ months after decortication. Note early scoliosis in (A).

The first 2 decortications were undertaken without the benefit of antibiotics, with excellent results.

Thoracoplasty is now rarely employed as definitive treatment. It is however used on occasion in conjunction with resection to help obliterate the pleural space.

Each resected portion of lung tissue is sectioned and studied in gross and microscopically and an effort is made to correlate pathological and pre-operative roentgen findings. On occasion the X-ray evidence of cavitation is not confirmed on examination of the surgical specimen and what would appear to be an annular radiolucent space radiologically is in fact a lesion filled with solid or liquid material. Similar findings have been reported from other centres.[4] In other respects also surprises may occur. A lesion that had appeared stable radiologically for many months may show evidence of active disease on microscopic section. On the other hand, it has occurred that segmental or wedge resection has been performed on the basis of an obvious residual lung-lesion demonstrable on X-ray while the pathologist has been hard put to it to demonstrate any discrete lesions in the resected specimens.

Tuberculous Meningitis. Isoniazid has made a major contribution to the outcome of chemotherapy of this form of tuberculosis. Such are the results obtained that intrathecal administration of streptomycin has become a rare necessity rather than a matter of routine. Daily intramuscular streptomycin is considered important for the first 3 months of treatment, with PAS and INH, the latter in a dosage of 8-10 mg. per kg. per day for the first 10 days of treatment, and in a smaller dosage thereafter. Treatment is continued for 18-24 months. Cortisone is used where spinal block has developed.

Miliary Tuberculosis is dealt with similarly to tuberculous meningitis.

Tuberculosis of the lymph nodes yields to triple drug therapy. Local excision is sometimes required.

Genito-urinary tuberculosis is so large a subject that it cannot be adequately dealt with here. Three-drug treatment gives excellent results, when combined with rest and sanatorium care, but careful investigation before, during and after therapy is as necessary as ever to determine correct management. Experience is leading to the belief that intravenous pyelograms should be performed at intervals during and after treatment to detect as early as possible the development of ureteral stricture, which is a not infrequent complication during treatment. Epididymitis resolves almost invariably with drug therapy alone. Nephrectomy or segmental resection of the kidney is still required on occasion. Aortography is proving of value in the investigation of renal tuberculous disease.

Domiciliary Treatment

Management of tuberculosis in Ontario has been largely based on treatment in sanatorium. Until recently all efforts aimed at providing adequate accommodation in well-staffed and well-equipped sanatoria for known and new cases with active tuberculosis. Now the reverse obtains and the efforts are directed at finding cases to maintain high bed-occupancy. Domiciliary treatment

has therefore been unnecessary, and its wary introduction now is not because of change in policy, but is rather a yielding to public demand. With short waiting-lists for admission or with beds actually available at once in certain sanatoria there is little or no delay between notification and admission, so that the question of domiciliary treatment does not arise at this stage. However, with 12 months' treatment in sanatorium of patients who often were not ill at the time of their admission, it is not surprising that ever more frequently discharge is requested before treatment is completed in full.

At the time of writing certain criteria are being drawn up which are to be fulfilled before patients obtain approval for discharge from sanatorium to continue drug treatment in their homes at public expense. These criteria are based on extent of disease, duration of therapy, sputum conversion and X-ray appearance. These conditions, it may be said, are quite stringent and will certainly not lead to a marked increase in the number of empty sanatorium beds all at once. It will however be another step in that direction, so that it will become ever more urgent to give consideration to alternative uses to which sanatorium beds and buildings may best be put.

Lest it be thought that the long stay in sanatorium is an unalleviated imposition, it should be pointed out that there is surely no better organization to aid and assist the patient and his family than in Ontario. Rehabilitation is a most important part of sanatorium life. Whether this consists of helping a high-school student to pass his next grade, or teaching an immigrant to speak English, or occupational therapy, it is a rare patient who is not a better man after his stay in sanatorium, quite apart from his clinical condition. Liaison between sanatorium, rehabilitation officer, social services, and industrial management, is outstandingly good.

Discharge from sanatorium is upon recommendation by the medical staff. The municipality of which the patient is a legal resident is responsible for his or her post-sanatorium care if it be required. The proposed place of residence of the patient is inspected and declared suitable or not as the case may be, and financial assistance is provided if needed and for as long as may be necessary.

The 14 sanatoria are owned and operated by voluntary non-profit organizations. The over-all cost of maintaining sanatorium services was $5.34 per patient-day in 1953. Of this 75% is contributed by Provincial Authorities, the remainder being provided through such agencies as the Indian Health Service, Department of Veterans' Affairs, Workmen's Compensation Board, etc. Contributions from hospitalization insurance plans and patients amount to only 3·6% of the total revenue.[5]

SUMMARY

A short review is given of some aspects of tuberculosis with respect to conditions prevailing in Ontario. Particularly stressed are long-term chemotherapy and the outstanding management of the problems of rehabilitation and after-care. Some features of public-health control are discussed and brief mention is made of the cost of sanatorium treatment and the sources of revenue of these institutions.

It is a pleasure to acknowledge the advice and encouragement received from Dr. C. A. Wicks, Superintendent, Toronto Hospital, Weston.

REFERENCES

1. Gryzbowski, S.: Personal Communication.
2. Capon, A. W. (1954): Canad. Med. Assoc. J., **70**, 62.
3. *Idem:* Personal Communication.
4. Maycock, R. L., Dillon, R. F. and Stead, W. W. (1955): Amer. Rev. Tuberc., **71**, 529.
5. Wicks, C. A. (1954): Canad. Hosp., **31**, 35.

DIETARY HABITS IN FINNISH LAPLAND

SOME PERSONAL INVESTIGATIONS

J. M. LATSKY, M.Sc., PH.D., F.R.S.S.Af., F.A.P.H.A.

Chief Nutrition Adviser, Union Department of Nutrition

A few years ago, at the request of two international organizations and with the assistance of the International Red Cross Society, it was made possible for me to pay a visit to Arctic Lapland to see for myself something more about the daily life and, particularly, dietary habits of these nomadic people of the Land of the Midnight Sun. Old as Europe may be, very little is actually known (or rather described) about this part of the globe.

The chief reason, I daresay, why I was asked to undertake this survey lay in the fact that as I was an inhabitant from 'the very opposite part of the globe' it was hoped that my findings, views or reactions would at least be scientifically objective. Once we were inside the North Polar region the people whom I interviewed and who accompanied our safari were eager not only to *show* me what living under Arctic conditions was like, but also to make me *feel* it!

Recently, on reading through my reports again, I decided to summarize my main findings and impressions, which during a recent visit to Europe (only some three weeks ago) I was again to check in Rome with two Finnish nutritionists, who assured me that the facts recorded are still essentially unchanged and correct. My chief reason for publication of this article is, however, not so much because of potential useful application to South African conditions of its contents, but because the peculiar nature of these very contents has invariably interested scientific colleagues, and I give it here for what it may be worth to any reader who may find it interesting.

Throughout the expedition I was accompanied by Mr. N. Grönholm, a Finn, who undertook the detailed day-to-day organization of everything and acted as interpreter. The language of the Laplander gets further and further away from Finnish the further north of the Arctic circle one travels, until to my ear it eventually sounded precisely like the 'click-clack' of the Kalahari Bushmen.

From Helsinki we proceeded by air to Rovaniemi (right on the Arctic Circle) whence we journeyed to the north of the country on the Utsjoki road, taking in well-known Lapp settlements such as Karigasniemi, Sodankylä, Vuotso, Ivalo, Inri on the borders of

the Great Lakes, etc. The time of the year was spring, and we made a less extensive visit towards the end of winter and a third brief visit organized from Hammerfest (the most northern town in the world) to the vicinity of the boundary between Norway (note, not Sweden or Finland) and Russia at the middle of June (nearly midsummer) under a hot sun the heat of which was still being sharply reflected from the endless plains of snow and ice and which, on top of everthing, just never would set.

BACKGROUND

Where the Lapps originally came from is still a matter of debate. They may, however, all be divided into 3 groups: poor sedentary families making a living chiefly through fishing, the nomadic mountain Lapps who shepherd their reindeers practically all the time, and the forest Lapps in the wooded areas where they remain more or less settled with their reindeer herds.

In Finnish Lapland (the area actually visited) there are about 5,000 of them, with another 25,000 and 8,000 respectively in Norway and Sweden. They usually congregate alongside the lakes and rivers, not more than two or three families at times living together, forming the typical little Lapp 'village'. By nature they are a shy and suspicious people and will not live near main roads.

In size and stature they are a small but sturdy race with a surprising endurance, usually dark skinned, with brown eyes that serve as a better protection against snow blindness, the sunlight being exceptionally strong in Lapland. Their short bow-legs are highly suggestive of early rickets in many of them.

The reindeer forms the basis of the Laplander's existence and the nomadic Lapps follow their herds the whole year round—a rather unusual order of things, where man's life is being determined by the needs of his animals. From the reindeer they get food, thread (from the dried sinews) and clothing (from the skin); even sleeping on the reindeer skins, for they use no mattresses.

NUTRITION

The Lapp diet consists chiefly of reindeer meat, some fish and potatoes, herbs, berries, milk and milk products (from both cow and reindeer), bread and coffee. The main dish, however, remains reindeer meat and potatoes, some fish and porridge, and always coffee.

Meat

Meat is eaten 3 times a day. The animals are slaughtered from the beginning of September until the end of March, particularly in the spring so as to get the meat dried before the weather becomes too hot. After March neither the meat nor the skin of the animal is of a particularly good quality. The animal is killed by stabbing through the heart and not by cutting the throat. When the carcass is cut up no bones are broken, the meat being neatly cut off the bones in small strips or pieces. The blood is carefully collected from the thoracic and abdominal cavities. The small intestines are used for making sausages while the freshly scraped stomach is cut into small fragments and fried in fat.

All parts of the animal are eaten, including head (with brains), feet, all intestines, and even the udders of the ewes. The bones are used for soup and afterwards split with a strong knife for taking out of the marrow. The brains, fried with flour, are considered a real delicacy; so is the tongue, which is usually dried or smoked. The liver is grilled over an open fire. Even the lungs are eaten this way when meat becomes scarce.

The meat to be stored is cut in rather thin strips, sprinkled with salt, and left for approximately 4 hours, after which it is hung out in the open air to dry, where it remains for about 5—6 weeks—day and night, in sunshine, rain or snow. Some of the thick layer of fat immediately below the skin is purposely left on the surface to give a thick gravy when the meat, months afterwards, is fried or boiled. In this gravy the Lapps meticulously soak their rye bread and what is over is used for frying other foods and in soups. The average-sized reindeer will yield 35—40 kg. of meat and about 4 kg. of fat. A big Lapp family will slaughter about 1 reindeer a week and a rich family will consume up to 10 reindeers per person per annum (the steaks usually being sold separately, however). The legs, spinal column and head are always consumed immediately, particularly in soups.

By the time most of the moisture has evaporated the meat has shrunk to about half its original size, the weather-beaten surface has hardened to such an extent that harmful organisms from outside have little or no effect on it, and the dried meat can be stored indoors. It is used solely during the summer time and preferably only after one year's storage (it is quite unusual for the Laplander to eat dried meat in winter). It is either carved into small pieces with a sharp knife or grilled.

Warm blood drunk directly from the wound of the stabbed animal is supposed to be particularly good against colds. Blood is also considered an excellent food for any recuperating person, when it is usually boiled with some broth or prepared as a gruel mixed with rye flour, into which small pieces of fresh reindeer stomach may be stirred. So much is thought of the blood as a food that, as fresh blood is not always obtainable, it is collected and preserved frozen in reindeer stomachs. The fresh stomach of a slaughtered animal, after careful scraping, and rinsing with clean water, is filled with blood, tied up and kept buried in snow. When required, a piece of the block of frozen blood (moulded according to the shape of the stomach) is sliced off like cheese. Coagulated fresh blood is often also mixed with rye flour, salted and made into sausages. What is left of this mixture of blood and rye flour is made into 'blood dumplings', or it may even be baked into the bread.

An important item on the menu every day is soup, which is served at night, often as late as midnight (remember that in summer this is the land of the Midnight Sun). Meat cut into small pieces is put (unwashed) into the pot. Water is added, just enough to cover the meat, plus a little salt. The pot is kept boiling for 3—4 hours on a slow fire, after which the fat is skimmed off into a separate container, into which each piece of meat removed from the pot is dipped before being eaten. After the meat is consumed, the broth is served into cups and drunk. Meat grilled over an open fire or fried in a pan is not dipped into fat gravy before eating.

During the day cold or dried food is often eaten as 'snacks', e.g. soup, left over from the day before, frozen salted blood or milk, dried meat, cold marrow, raw salted fish, cheese with bread, and always coffee.

Now and then beef, mutton and pork may also be eaten, usually fresh; also meat from the elk (moose), polar bears, beavers, squirrels, hares, otters and seals. Of the birds, the ptarmigan is considered the most important. As a food this bird, particularly in its dried form, is considered a delicacy, and by shooting and systematic trapping of the bird the Lapps often earn a good deal. Sea-birds such as wild swans and geese are hunted everywhere. Eggs are collected whenever possible and consumed, usually hard-boiled.

Milk

Reindeer milk is considered to be rather nourishing. From analyses obtained in Helsinki it contains about 67% water, 8·3% casein and 7% fat. It is often freshly boiled or preserved by freezing and consumed as cheese later on. It is usually plentiful in summer during the calving season. Fresh milk is often stored for long periods in a wooden container very much like a wine vat, deeply hidden in the snow. From this container supplies are then drawn in time of scarcity. This milk inevitably turns sour but remains, of course, quite nutritious and edible.

The main part of the summer milk is made into cheese. The milk is mixed with water, the mixture brought to blood heat, and rennet added. When curdled it is heated over glowing coals, and the solid part with the whey pressed out is put into a mould where it remains for half a day under the weight of heavy stones. It is then dried for a few days and immediately stored. This way, about ½ kg. of cheese is obtained from 3 litres of milk. Of the whey, with rye flour added, a gruel is made.

In another milk process a fresh reindeer stomach is gradually filled with fresh milk while hung below the ceiling practically above the open fire-place, causing quick curdling of the milk and slow evaporation of water. In other words, the milk is slowly smoked or cured in what the Laplander calls the 'shine' of the fire, which is supposed to bring out the 'aroma'. Milk is added two or three times, until the whole stomach is filled with this dried 'grainy' cheese milk, the process taking 2—3 weeks in all. This the Lapp calls 'dried milk'; he does not know the powdered form. It is reconstituted with water for 'coffee cream'. In hot coffee it dissolves almost completely. A 'stomach' lasts a Lapp family almost a whole winter.

In the middle of November, when the first real frosts begin, the

preparation of frozen or 'ice' milk is started. The milk is merely left outdoors in various types of containers to freeze hard, to be used as required during the cold season.

At present the milk position in Lapland is unsatisfactory, many children going without. Usually, however, Lapp children do not like milk. The nomadic Lapps always use reindeer milk, but stationary families less frequently. In the small Lapp villages cows are kept by those families who do not shepherd their reindeer about the country.

Fish

Fish constitutes a very important part of the Lapp diet during the summer. They catch trout, grayling, pike and perch, but in autumn and winter it is usually turbot. It is eaten boiled, dried, smoked or salted. Fresh fish is usually boiled in a little broth for about 1 hour, some salt being added. In the case of fat fish, the fat layer is skimmed off to add to rye flour flavoured with 'pine peel' to make dumplings.

Pine peel consists of the bark peelings from pine trees, which are dried indoors under the ceiling for some days, roasted over willow coals to burn up the resin, and then ground up like pepper to be eaten in soups or sprinkled over meat and fish.

The drying of fish takes 2—3 weeks and the dried fish is eaten mainly in autumn and early spring. Trout is reckoned to be the best fish for drying. Later in autumn, when the drying season is over, freshly caught fish will be salted for winter use. The salted fish is considered ready after 1—2 weeks. Often very little salt is used and the fish turns sour; this sour fish, however, is preferred. The roe is boiled intact with the fish or taken out separtely and salted. It is customary to eat roe in the morning on the breakfast bread.

Fish gruel made of water, stewed fish, roe, some flour and a little salt is very popular. A very common dish is boiled fish and milt roe with blueberries. The roe of the salmon is particularly popular as a gruel or with bread. Of the sea fish the salmon is the most important. It is eaten both fresh and salted. Fresh boiled salmon is taken out of the broth and eaten as such, the broth being mixed with flour and consumed as gruel. When salted, the salmon is ready for consumption after a week. It is also dried. A certain kind of fish-ball or patty is made from fresh salmon, dried or fresh reindeer blood, and flour.

Other Foodstuffs

For the Lapps living near the Arctic ocean, the main dish in winter is salted cod and potatoes (unfortunately often stored over long periods). Their bread consists chiefly of rye with some barley meal made only with water. The dough is kneaded by hand for about 10 minutes and baked for about ½ hour in a ground oven previously heated by coals which are scraped out before the bread is put in, the door being carefully sealed up with clay on the outside. When available, brains and blood of reindeer or fish roe are kneaded into the dough, resulting in a highly nutritious though 'heavy' bread, since it does not rise too well.

Generally speaking, vegetables are scarce and expensive and hence the intake is exceptionally low, making Lapp diets extremely monotonous. At the time of our visit, low-quality carrots were costing about half-a-dollar per kg.

Coffee is drunk in large quantities at any time of the day. The Lapp uses salt in his coffee (added during boiling) but also likes sugar and 'cream' with it. The salt is seldom omitted. On rising in the morning they will first have coffee, followed by reindeer meat soon after.

The sap of the birch tree is tapped in spring and consumed as such. A species of Archangelica plant flourishes near springs in the mountains and is eagerly sought after by the nomadic Lapps while following their reindeer herds. The stems of this plant are collected immediately before flowering and the inside core eaten as an 'asparagus' delicacy. 'Salt grass' is collected in spring, cut up into tiny fragments, and eaten with milk dishes.

In the autum there are several kinds of berries, the most common being crow-berries which are either eaten fresh or with sour milk, stewed fish or fish broth, or mixed in gruel or porridge. Blueberries are also eaten fresh or with sour milk; often a handful may be put into the broth which is left over after the solid parts of a fish dish have been consumed. A type which keeps very well is usually saved for winter. The necessity for obtaining more information on the composition of these supplementary foodstuffs is evident.

Nutrition Diseases

According to Dr. Laitinen, the Deputy Chief Health Officer of Lapland, between 60% and 80% of Lapp infants may show some or other manifestation of rickets in spring. In spring she toured the outposts of Lapland with a mobile clinic, herself visiting nomadic families on skis and snowshoes. In some areas near the Arctic ocean the Lapps consumed cod-liver oil as a gravy with their meat, with a concomitant low incidence of rickets, which, on the other hand, is always relatively high in Central and Southern Lapland, away from the sea.

Education in nutrition was greatly needed, particularly information for mothers regarding the proper nutrition of their infants, in which respect the small Health Centres have a difficult task on hand: according to the Health Nurses, children are started too early on reindeer meat and coffee, and at 2 months of age an infant may already receive the cream of reindeer milk, whipped up with sugar, which is considered an ideal food for babies!

According to the district surgeon of Ivalo, visible nutrition-deficiency states in adults are practically unknown amongst Finnish Lapps. In spring they may be a little pale but, except for the fact that they are usually of smaller and thinner build than the ordinary Finn, their nutritional status is generally satisfactory. In general also their teeth are not bad. According to Dr. Pöntynen the dental health officer in Sodankylä, the incidence of caries is not marked; this, in part, she ascribed to an unusually high protein intake. Examination of Lapp skulls in the museums invariably showed very worn but not carious teeth and, generally speaking, the average Lapp is considered to have good teeth. Since the war, however, Dr. Pöntynen had gained the impression that, owing probably to a higher intake of sugar and whiter bread, the position in respect to dental caries was worsening.

Almost every adult Lapp smokes a pipe and many older men chew tobacco. Many Lapp women too are habitual smokers.

OTHER DISEASES

Amongst the Lapps of Northern Lapland tuberculosis was said to be practically unknown before the war, the incidence of this disease then being much higher in the South than in the North; at present the situation is said to be reversed. The Northern Lapps were evidently lacking in resistance to the disease, so that their evacuation during the war to Southern Finland proved a very disastrous step, introducing tuberculosis amongst them for the first time.

According to the district surgeons certain diseases common in other communities are rare or unknown amongst them, e.g. cancer, while venereal disease was seldom encountered. Secondary anaemias and pneumonia, however, were reported to be common; so also tapeworm infestation due to the consumption of fish in the lake areas and of pork in rural areas with poor sanitation facilities.

There is, furthermore, also much overcrowding and disruption of family life owing to the fact that the boundary between Lapland and the USSR had been shifted inwards to take in a great part of original Finnish Lapland, and the majority of Lapp families had preferred to retreat with the boundary to face enormous problems of resettlement and insecurity.

My grateful thanks for valuable information and assistance in many different ways are due to the following persons:

Mr. N. Grönholm, Department of External Affairs, Helsinki.
Mr. Aarne Williamo, Director of the Finnish Branch of the International Red Cross Society.
Mr. Urho Tilansuo, Office of the International Red Cross Society, Rovaniemi.
Dr. Ikka Väänänen, Chief Medical Officer for Lapland, Rovaniemi.
Dr. I. Laitinen, Deputy Chief Health Officer for Lapland, Rovaniemi.
Dr. V. S. Ollilainen, District Surgeon, Ivalo, Lapland.
Dr. Yrjö Leskinen, District Hospital, Sodankylä.
Dr. S. Sirkka Pöntynen, Dental Health Officer, Sodankylä.
Health Sisters Sisko Suomalainen and Aino Halminen, Country Health and Baby Clinics, Inari, Lapland.

My thanks are also due to the Secretary for Nutrition (Union of South Africa) for permission to publish this paper.

CODE OF PRACTICE FOR THE PREVENTION OF EXPLOSIVE AND ELECTRICAL HAZARDS IN HOSPITALS*

The South African Bureau of Standards has recently approved a code of practice for reducing the risk of the explosion of inflammable anaesthetic or other vapours in operating theatres and other explosive and electrical hazards in hospitals.

The code has no compulsory effect but the preamble strongly recommends that hospital authorities should ensure that the code is enforced wherever practicable.

SOURCES OF DANGER

The code of practice is a comprehensive document dealing with the elimination of the hazards of igniting flammable mixtures o combustible anaesthetic agents in operating rooms, delivery rooms and other places for surgical treatment, and also the hazards of electrical shock from power and lighting circuits; and the construction, installation, maintenance and use of all relevant equipment and structures.

It has been found that the use of combustible anaesthetic agents, e.g. ether, ethyl chloride, ethylene, etc. is always attended by certain risks, simply because these substances form combustible or flammable mixtures with air, oxygen or nitrous oxide, all or any of which may be present in operating rooms.

With such flammable or explosive mixtures present, due consideration has to be given to possible sources of ignition. It has been found that the main sources of ignition are fixed or portable electrical equipment, the accumulation of static electricity charges and, more obviously, open flames or sparks or heat sufficient to set the explosive mixture alight.

In addition to the flammable anaesthetics that may be used, there are also a number of combustible disinfectants. Improper use or spillage of these may expose the patient to injury from the ignition of the disinfectant itself.

The code points out that electrical systems necessarily present a source of danger, since sparking, arcing and heat are frequently attendant on the use of these systems. Similarly, the accumulation of a static electric charge in non-conductive objects may result in a spark discharge when the 'accumulator' has no easier conductible path than the air.

COUNTER-MEASURES

The code lays down provisions for the proper design, lay-out, and planning of all affected buildings, equipment and facilities. These matters are covered as follows:

1. The *ventilation* of storage locations for combustible anaesthetic agents, and the actual locations used for anaesthesia, i.e. operating rooms.
2. The *storage and piping of gases*, due regard being paid to construction of storage rooms, and the installation of electrical equipment therein, actual piping systems, the identification of gas cylinders and pipes, and finally the safe design of anaesthetic apparatus.
3. The *electrical wiring and equipment* used or installed, including sparking possibilities of switches and plugs, flame-proofing and earthing. Strict control is being maintained in locating or installing, as well as operating, lighting fixtures, supports, sliding contacts, control switches. Strict attention must be given to the arrangement of circuits, the location of service equipment, earthing arrangements, control devices, sockets and plugs, lighting switches and fixtures and so on.
4. The *reduction of electrostatic hazards* by allowing for adequate humidity control (static discharges occur more easily in dry air), the installation of adequate conductive flooring, conductive metal furniture and fittings, sheets and pads, rubber tubing, belting. In short, this section aims at reducing the number or degree of non-conductive articles used in hazardous locations to prevent the accumulation of static charges in any non-conductive item.

* Abstracted from an article *Prevention of Electrical Hazards in Hospitals*, S. Afr. Standards Bull., vol. 8, p. 224, (June 1955).

MODEL REGULATIONS

In the section of the code on Administration, attention is given to the recognition of hazards by hospital staff, the responsibility of the hospital administration for taking the necessary precautions, and the promulgation of relevant regulations for observance by all hospital staff. In addition, recommendations are given for the correct use of a particular anaesthetic or antiseptic when the use of some item of electrical or heat-producing equipment is unavoidable, and for the correct disposal of residual anaesthetic after an operation.

Hospital authorities should be in a position to determine the adequacy of storage space for anaesthetics or antiseptics. The code lays down certain procedures for the handling of gases, the upkeep and maintenance of electrical equipment and wiring systems, as well as the prevention of electrostatic hazards in connection with the shoes, coats, covering sheets and belting worn or used by the hospital personnel. Attention is also paid to means of ensuring that there is a conductive path to earth from any equipment, fittings and furniture.

The code suggests that the following regulations, amongst others, should serve as model regulations for observance in all hospitals in the Union:

1. The choice of the anaesthetic agent and the technique to be used is the responsibility of the anaesthetist.
2. The anaesthetic agents, cyclopropane, divinyl ether, ethylene, ethyl chloride, ethyl ether, and trichloro-ethylene, should not be used in operating rooms which have non-conductive floors.

Whenever the above agents are used, the following precautions should be observed:

1. The anaesthesia machine should be inspected and tested before use by the assigned anaesthetist particularly for leakage from the machine itself or for the fit of the mask. If appreciable leakage is observed, the machine and mask should not be used.
2. If practicable, all personnel and visitors in the operating room should wear conductive shoes which have been tested as satisfactorily conductive immediately prior to the operation.
3. All operating room equipment should be equipped to provide a conductive path to the floor, and such contact should be maintained.
4. Outer garments, wherever practicable, including hosiery worn by the operating room personnel and visitors, should not include fabrics of silk, wool or synthetic materials such as 'sharkskin', nylon, rayon and orlon.
5. Cotton blankets should be used.
6. The operating table pad should be covered with a conductive material.
7. The operating theatre equipment, including anaesthetic machines should be periodically inspected by the engineering staff. Conductivity of the floors and equipment should be tested at the same time. A written record should be kept of the resultant readings and inspection results.

ASSOCIATION'S BRONZE MEDAL PRESENTED TO MR L. R. BROSTER, F. R. C. S.

At the meeting of the Federal Council held in Pretoria in October 1954, it was agreed with acclamation that Mr. L. R. Broster be awarded the Bronze Medal of the Association for his services to the medical profession in South Africa.

The presentation of the medal took place in Toronto on the occasion of the Joint Meeting of the British and Canadian Medical Associations. Dr. T. Clarence Routley, President of both Associations, made the presentation after a citation had been read by Dr. A. H. Tonkin, Secretary of the Medical Association of South Africa. The citation was as follows:

'Lennox Ross Broster, M.A., D.M., F.R.C.S. (Eng.), received his earlier education at St. Andrews College and the Rhodes

University College, Grahamstown, in South Africa. He was elected to a Rhodes Scholarship in 1909 and went to Trinity College, Oxford, to study medicine. While at Oxford he received his rugby blue.

'Mr. Broster had a distinguished academic career and, although, he elected to remain in England in order to practise surgery, he has kept a close link with his mother country. For many years he served the earlier Medical Association of South Africa (B.M.A.) on the Representative Body of the British Medical Association and has always been ready to help the present Association and South African students generally. His interest in the younger postgraduate students who have travelled from South Africa to study in London is particularly appreciated.

'His work as Chairman of the Committee of the Empire Medical Advisory Bureau of the British Medical Association, as a Governor of London House and for the Postgraduate Foundation, is well known to many and is greatly appreciated by his colleagues in South Africa, who recognize the link in Commonwealth solidarity which Mr. Broster has forged.

'As a token of its respect and gratitude, the Medical Association of South Africa requests you, Mr. President, to present to Mr. Broster the Association's Bronze Medal for meritorious service to the medical profession.'

Mr. Broster has expressed his pleasure at receiving this award, in a letter addressed to the Chairman of the Federal Council, the contents of which will be made known at the next meeting of the Council.

RECENT ACCESSIONS TO THE MEDICAL LIBRARY, UNIVERSITY OF THE WITWATERSRAND

Allen, A. C. The skin: a clinicopathologic treatise. St. Louis. Mosby. 1954.

Association for the aid of crippled children. Prematurity, congenital malformation and birth injury. New York. Association for the Aid of Crippled Children. 1953.

Astrand, P.-O. Experimental studies of physical working capacity in relation to sex and age. Copenhagen. Munksgaard. 1952.

Aylett, S. Surgery of the caecum and colon. Edinburgh. Livingstone. 1954.

Bailey, C. P. Surgery of the heart. London. Kimpton. 1955.

Bakwin, H. Clinical management of behaviour disorders in children, by H. B. Bakwin and R. M. Bakwin. Philadelphia. Saunders. 1953.

Best, C. H. Physiological basis of medical practice, by C. H. Best and N. B. Taylor. 6 ed. London. Baillière. 1955.

Boyden, E. A. Segmental anatomy of the lungs. New York. Blakiston. 1955.

Burrows, W. Textbook of microbiology. 6 ed. Philadelphia. Saunders. 1954.

Buxton, P. A. The natural history of tsetse flies. London. Lewis. 1955.

Cash, J. E. Physiotherapy in some surgical conditions. London. Faber. 1955.

Color atlas of pathology. Philadelphia. Lippincott. 1954. v. 2.

Croxton, F. E. Elementary statistics with applications in medicine. New York. Prentice-Hall. 1953.

De Coursey, R. M. The human organism. New York. McGraw-Hill. 1955.

Dubos, R. J., ed. Bacterial and mycotic infections of man. 2 ed. Philadelphia. Lippincott. 1952.

Dunbar, F. Emotions and bodily changes. 4 ed. New York. Columbia U.P. 1954.

Edgeworth, F. H. The cranial muscles of vertebrates. Cambridge U.P. 1935.

Elliott, F. A. Clinical neurology. London. Cassell. 1952.

Eranko, O. Quantitative methods in histology and microscopic histochemistry. Basel. Karger. 1955.

Farquharson, E. L. Textbook of operative surgery. Edinburgh. Livingstone. 1954.

Fink, D. H. Release from nervous tension. London. Allen & Unwin. 1954.

Garrison, F. H. Garrison and Morton's Medical bibliography, by L. T. Morton. 2 ed. London. Grafton. 1954.

Glick, D., ed. Methods of biochemical analysis. New York. Interscience. 1954.

Greenhill, J. P. Obstetrics. 11 ed. Philadelphia. Saunders. 1955.

Jaeger, E. C. A source-book of medical terms. Springfield. Thomas. 1953.

Klopfer, B. Developments in the Rorschach technique. New York. World Book Company. 1954. v. 1.

Lawrence, R. D. The diabetic ABC. 11 ed. London, Lewis. 1955.

Lejeune, F. Deutsch-Englisches, Englisch-Deutsches Wörterbuch für Ärzte. Stuttgart. Thiene. 1954. 2 v.

Lodge, T. Recent advances in radiology. 3 ed. London. Churchill. 1955.

McFarland, R. A. Human factors in air transportation. New York. McGraw-Hill. 1953.

O'Neill, D., ed. Modern trends in psychosomatic medicine. London. Butterworth. 1955.

Romer, A. S. The vertebrate body. 2 ed. Philadelphia. Saunders. 1955.

Roques, F. W., ed. Midwifery. 9 ed. London. Arnold. 1955.

Sadler, W. S. Practice of psychiatry. London. Kimpton. 1953.

Sarton, G. Galen of Pergamon. Lawrence. University of Kansas press. 1954.

Seward, C. Bedside diagnosis. 3 ed. Edinburgh. Livingstone. 1955.

Sorsby, A. Modern trends in ophthalmology. 3rd series. London. Butterworth. 1955.

United Nations Educational, Scientific and Cultural Organization. Inventories of apparatus and materials for teaching science. Paris. UNESCO. 1954. v. 3 part 5: Medical science.

Wiener, N. The human use of human beings. revised ed. London. Eyre & Spottiswoode. 1954.

Wiles, P. Essentials of orthopaedics. 2 ed. London. Churchill. 1955.

Wolf-Heidegger, G. Atlas of systematic human anatomy. Edinburgh. Livingstone. 1955. v. 1.

Woodger, J. H. Biology and language. Cambridge U.P. 1952.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

A NEW MOBILE MASS MINATURE RADIOGRAPHY LABORATORY FOR USE ON BAD ROADS

The Scottish Department of Health and Ministry of Works have designed a travelling laboratory for mass radiography specially for bad road conditions (bad surfaces, humpback bridges and hills) in the Highlands and Islands of Scotland. Owing to scarcity of diesel fuel in those areas the engine is of petrol-driven type.

It consists of a light-weight aluminium double-skinned body, with 9/16 inch resin-bonded plywood floor, mounted on a F.V.S. 12/5 Morris Commercial chassis (12 feet 6 inch wheel-base). The interior is divided into 2 compartments by a steel radiation-proof partition with light-tight sliding door. Forward is the examination room with X-ray apparatus, and at the rear the dark room.

The X-ray apparatus is a Philips M.C.S. 45 mm. unit for both mass-miniature and normal full-size radiographs consisting of:

(1) H.T. generator and rectifier, constructed as separate units and connected by shock-proof cables. The output is 400 mA at 50 kVp, and 200 mA at 100 kVp.

(2) Tube columns and tube assembly with 'Rotalix' tube. Synchronized vertical travel of X-ray tube and camera tunnel is effected by means of a motor drive.

(3) Camera unit, fitted with Philips 45 mm. mirror camera. Provision is also made for the production of normal full-size radiographs.

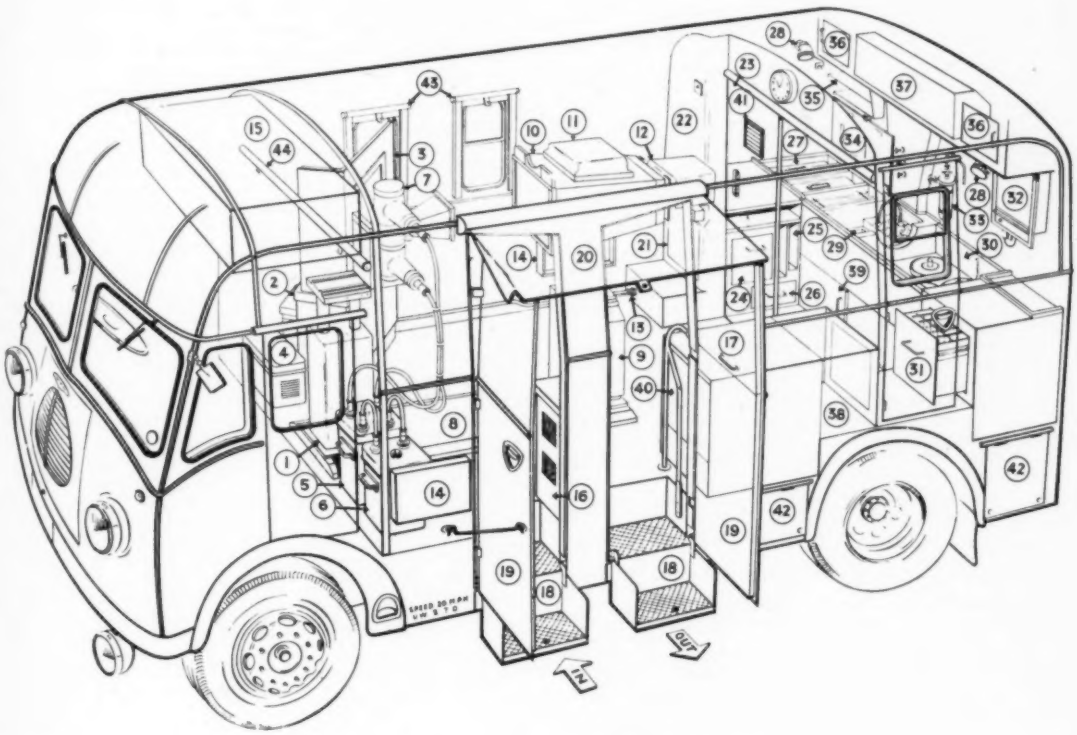
(4) Control unit: Line voltage compensator, universal control meter, kilovoltage selector, mA selector, mA meter, electronic timer, and visual indicator panel. The X-ray unit is also fitted with a photo-electric timer which automatically controls the exposure time.

(5) Protective screens for operator and positioner.

The dark room equipment includes thermostatically controlled film-processing units for full-size and miniature films, film-loading bench and film store, drawer-type drying cabinet, and sink with hot and cold water services ('Polythene' plumbing). Water storage tank (20 gallons) with bore connections to the water mains and a semi-rotary pump for use where water mains are not available. All water passes through a coarse filter and a fine filter is available for film washing.

The electrical energy (230 volt and 12 volt) can be taken from the supply mains. For areas where this is not available a trailer generator is provided, powered by a 12 H.P. petrol engine and giving an output of 14 kW intermittent load and 5 kW auxiliary load, and fitted with 2 heavy fly-wheels on the alternator rotor to maintain correct speed during heavy instantaneous X-ray loads.

The contractors are Weymann's Ltd., Addlestone, Surrey, for body work and interior fittings, and Philips Electrical Ltd., London, for the complete trailer/alternator.



1. Philips M.C.S. apparatus. Tube assembly column.
2. M.C.S. control desk.
3. M.C.S. protective screen (operator).
4. M.C.S. mains resistance compensation unit.
5. M.C.S. H.T. 4-valve rectifier unit.
6. M.C.S. H.T. transformer unit.
7. M.C.S. Rotalix tube 1·5 mm. focus.
8. M.C.S. base assembly.
9. M.C.S. hood assembly column (motor and hand drive).
10. M.C.S. light-tight hood assembly.
11. M.C.S. phototimer unit.
12. M.C.S. 45 mirror camera.
13. M.C.S. mains supply cable.
14. Panel heaters.
15. Storage cupboards over driving cab.
16. Paraffin space-heater (auxiliary).
17. Bench for film projector.
18. Folding steps.
19. Entrance and exit doors.
20. Canvas roller canopy over doors.
21. Pass-through cassette hatch.
22. Sheet steel partition.
23. Sliding door to dark room.
24. Film container.
25. Cassette storage.
26. Drawer.
27. Processing unit for large films.
28. Safelights.
29. Sink (general purpose).
30. Miniature film processing unit.
31. Large film drying cabinet.
32. Large film viewing lantern.
33. Water filter for miniature films.
34. Hinged cover over processing unit.
35. Shelves for processing tank lids.
36. Cupboards.
37. Water storage tank.
38. Cupboard in dark-room.
39. Cupboards under processing unit.
40. Cupboard and drawer unit in examination room.
41. Ventilator in sliding door (aural communication).
42. Storage lockers.
43. Roller blinds to all windows.
44. Roller blind between cab and examination room.

IN MEMORIAM

THOMAS PAUL DOWLEY, M.B., B.CH. (DUBL.)

Dr. Allan Lawson, of Maclear, E.P., writes: With the sudden death of Dr. Thomas Paul Dowley, the thinning of the ranks of the old country doctors becomes even more apparent. Noble men they were and the old Doctor was a shining example, cultured and erudite, sympathetic and wise. Dr. Dowley was a big man in all senses of the word, and to see his upright figure and energetic walk one found it hard to realize that he was in his 72nd year.

Thomas Paul Dowley

Of mental calibre far above that of the ordinary man, Dr. Dowley was at all times a modest gentleman, but he never allowed himself to stagnate and one seldom found him in his leisure hours without some scientific book in his hands. His cultural background endowed his conversation with wit and interest and made it a delight and a stimulation.

After graduating at Trinity College, Dublin, Dr. Dowley practised in England for a short period before coming to South Africa, where he settled in Nqamakwe. From there he moved to Tabankulu, to which he returned after serving in East Africa during the 1914 war. He then practised in Benoni, Karibib, Whittlesea and Elliot, and eventually settled in Maclear in 1932.

After 5 years in the Pensions offices in Pretoria and Johannesburg Dr. Dowley returned to Maclear for the last time and I had the privilege of working with him from 1951 until his death.

We all extend our sympathy to his widow and to his son Mr. D. Dowley and his daughter Mrs. J. Tasker.

'For they hear the wind laugh, murmur and sing
Of a land where even the old are fair,
And even the wise are merry of tongue'.

J. F. WICHT, M.A., M.D. (DUBL.), B.A. ECON., D.P.H. (CAPE TOWN)

Dr. Johan Fredrik Wicht died at the age of 59 at his home at Rondebosch, Cape, on 5 August 1955 after a long illness.

A member of an old Cape Town family, Dr. Wicht was educated at the S.A.C. School and the Universities of Cape Town and Dublin. He took the degrees of M.A., M.D. at Trinity College, Dublin, and the D.P.H. of Cape Town University where, in more mature years, he distinguished himself by taking the degree of B.A. in Economics.

Johan Fredrik Wicht

Dr. Wicht studied diseases of the chest at the Brompton Hospital, London, and elsewhere, and on his return to Cape Town started practice as a physician specialist. In 1926 he was appointed Medical Superintendent of Hospitals in the Cape Town City Health Department, which position he held until 1953, when he retired owing to ill-health. As such he was in control of the City Hospital for Infectious Disease at Portswood Road and Rentzkie's Farm and the Brooklyn Chest Hospital.

In these hospitals there is accommodation for more than 900 cases of infectious disease and tuberculosis. The greater part of this accommodation was built during Dr. Wicht's superintendentship. In his younger days Dr. Wicht worked at the City Hospital with the late Dr. Jasper Anderson, with whom his death breaks another link. In the early days of the Cape Town tuberculosis clinics Dr. Wicht conducted several clinic sessions a week and carried out the duties of tuberculosis officer.

He was an acknowledged authority on tuberculosis, infectious diseases and allied branches of medicine. At the University of Cape Town he was Lecturer in Infectious Disease and lectured to undergraduate medical students and to graduate students in the D.P.H. course.

Dr. Wicht was a man of many parts. He was interested in many branches of learning, in farming, music, Africana, a lover of animals, and in the past was devoted to equestrian sports and yachting.

Many years ago he suffered a severe injury to the leg from a riding accident, and much of the ill-health he endured for many years followed upon this injury.

Dr. Wicht was greatly respected and beloved by his medical colleagues. He was a brother of Dr. Luise Yates-Benyon, Dr. J. D. Wicht and Mr. H. H. Wicht. His devoted wife, to whom our deep sympathy is extended, attended him throughout his illness with the tenderest care.

Dr. J. Wolf Rabkin of Cape Town, writes: It was the first warm bright and sunny day after a long spell of wind and rain when Johan Fredrik Wicht was laid to rest in a place chosen by himself—a prominent koppie on his farm (Rocklands) at Klipheuvel. The sun was still shining on the surrounding snowy mountains when we left the koppie and turned to gaze at the small mausoleum which is the resting place of our friend and colleague.

A service had been held at St. Patrick's Church, Mowbray. A large congregation came to pay homage to his memory—friends, colleagues, some old patients, and representatives of the Municipality and University of Cape Town.

It is difficult at this hour to assess such a variegated personality as Frikkie Wicht. To lose one you have known for half a century is always sad. To lose one you have known intimately, and loved, leaves a deep void.

Born and bred in this beautiful city which he loved, he was of English, Afrikaans and German ancestry. He served in the Navy in both wars, and in the last war he volunteered in spite of a serious physical handicap. (He had broken his ankle some years previously and was partially incapacitated.) He disliked politics, but always responded to his country's call. He was a self-sacrificing, simple South African citizen—a brave, wise and upright man. He was modest, quiet and rather shy. He had a sensitive nature; criticism or a rebuff worried and saddened him. But in his intimate moments, in his study or in quiet conversation, he displayed his well-informed mind and his bright and witty personality. He would sit at ease, pouring out his great store of knowledge of history, prose and poetry, art, music, economics, philology and social science. He was a well-known polo player and a skilful yachtsman.

He was equally proficient in English, Afrikaans and German. He also spoke French and had some knowledge of Italian, Spanish and Danish. He played a number of musical instruments and showed skill in painting. His versatility was great but he was no dilettante. He never guessed. His knowledge was based on facts. He dabbled in poetry for his own amusement or for the benefit of his friends, and he wrote good prose. Many short stories from his facile pen were published under various pseudonyms.

He was an experienced, clear-headed and erudite clinician and an excellent diagnostician. I am glad to acknowledge my own deep indebtedness to him for a pleasant and profitable professional association for over 27 years. It was pleasant and instructive to do ward rounds with him and, in the lean years, these rounds were as welcome as water in the desert. He lived through a period when the medical horizon was rapidly widening. He shared in this development and so benefited both his patients and his students. The growth of the City Hospital during his time, both in size and repute, was phenomenal.

Besides the medical interest he took in his cases he was interested

in the human side of his patients. He was most kind to those in the tuberculosis wards and was a protagonist of vocational employment 30 years ago. He used to try to obtain employment for his patients before their discharge. He loved the children—his face lit up when he walked through the scarlet fever or diphtheria wards and he knew the Christian name of each child. He was fundamentally a clinician, and a Superintendent only by force of circumstances.

His nature was kind and courteous. He gave his services freely to any practitioner who sought his valuable opinion in a case of infectious disease or tuberculosis.

Wicht was engrossed in his work and in his other interests—the latest was farming. He was a great lover of animals and birds.

His brain was never at rest; he had an extensive and valuable library. He was persistent in his search for knowledge, and in that he showed a passionate energy. Already an M.A. he attended the University at middle age and took a B.A. in economics.

And so his life was serene and happy—like the fisherman who drifts in his boat, in a calm. But suddenly a storm arose. Whilst on leave in London he suffered a severe breakdown. He hastened back to Cape Town when he realized he was a sick man. But he was fortunate in his disposition. He suffered ill-health placidly and he took refuge in the riches of his nature and his versatility. Though confined to his couch he delved into the history of South Africa, and improved his knowledge of languages and music. Only a few days before his death we spent a pleasant hour in asking him questions from Brewer's *Dictionary of Phrase and Fable*. When I congratulated him on his answers he said it was common knowledge! He spent much time in devotional study. It has been said, 'Many bear the emblems but the devotees are few'. Frikkie was a true religious devotee. He suffered much and long but was sustained by the devotion of his beloved wife. We all offer her our deepest sympathy in her bereavement.

PROFESSOR OF SURGERY, UNIVERSITY OF CAPE TOWN

The Council of the University of Cape Town has appointed Dr. J. H. (Jannie) Louw, formerly Associate Professor of Surgery in the University, to the Chair of Surgery vacated by Professor J. F. P. Erasmus, who has resigned.

Professor J. H. Louw

Jan Hendrik Louw was born at Middelburg in the Cape in 1915, and was educated at the Rondebosch Boys' High School and the University of Cape Town, where he qualified in medicine in 1938. After serving as house physician to Professor J. F. Brock and house surgeon to Professor C. F. M. Saint at the then newly-opened Groote Schuur Hospital in 1939, he went into general practice at Bedford, Cape. Thereafter Dr. Louw joined the South African Medical Corps, receiving a commission as captain, and saw service as Regimental Medical Officer in the 2nd Division; a member of a surgical team 7th South African Casualty Clearing Station; Medical Officer in charge of surgical wards at No. 102 General Hospital, Middle East. Altogether he spent 2 years in the Western desert.

Towards the end of the war, Dr. Louw returned to Cape Town, first as Medical Officer at the Military Hospital, Wynberg, and, after demobilization, as Surgical Registrar to Professor Saint's surgical firm at Groote Schuur Hospital. Whilst stationed at Wynberg, he attended a postgraduate course in Surgery at the University of Cape Town, and obtained distinction in the clinical examination for the Ch.M. degree in December 1945. A year later he graduated Ch.M. (Cape Town) with Honours, upon a thesis entitled *The Morphology of the Main Bile Ducts*.

For the last 10 years Dr. Louw has been associated with the Groote Schuur Hospital and the Department of Surgery of the University of Cape Town. In 1946 he was appointed Honorary Assistant Surgeon to the Hospital, and some time later Assistant to the Professor of Surgery as well. At the same time he assisted Mr. Cole Rous, then Professor of Surgery, in his private practice in Cape Town.

At the end of 1950, Dr. Louw was selected as Nuffield Dominion Scholar, and spent 1951 in the United Kingdom and Scandinavia performing postgraduate work, mostly in connection with the surgery of childhood. On his return to South Africa in 1952, he was appointed in a full-time capacity as head of the surgical firm at Groote Schuur Hospital which included the children's Surgical unit, and became Senior Lecturer in Surgery and Deputy to the Professor of Surgery in the University. In 1954 he was created Associate Professor of Surgery—a novel academic distinction in the University of Cape Town—and has been acting Professor of Surgery since April of this year.

Professor Louw, who has made a special study of the surgery of childhood, has published numerous papers and his research activities have included the morphology of the biliary system, congenital intestinal obstruction, thermal burns, the response of newborn infants to major surgery, etc.

He is married, and has 3 children.

BOOKS RECEIVED : BOEKE ONTVANG

Malaria: A World Problem. By E. J. Pampana, M.D. and P. F. Russell, M.D., M.P.H. Pp. 72, with 25 illustrations. 3s. 6d. Geneva: World Health Organization. 1955.

Directory of Scientific Research Organizations in the Union of South Africa. Edited by D. Ryle Masson, B.Sc. (Eng.). Pp. 123 + ix, with plates. 25s. Pretoria: J. L. van Schaik Ltd. 1955.

Neuro-Vascular Hila of Limb Muscles. By James Couper Brash, M.C., M.A., M.D., D.Sc., LL.D., F.R.C.S.Ed., F.R.S.E. Pp. 100 + xvi, with 30 plates. 30s. Edinburgh & London: E. & S. Livingstone Ltd. 1955.

World Distribution of Spirochetal Diseases. Plate 15. $1.25. New York: American Geographical Society. 1955.

Surgery of the Sympathetic. By Alexander Lee McGregor, F.R.C.S. (Eng.), M.Ch. (Edin.). Pp. 192, with illustrations. 30s. Bristol: John Wright & Sons Ltd. 1955.

Management of Disorders of the Autonomic Nervous System. By Louis T. Palumbo, M.D. Pp. 186, with illustrations. $5.00. Chicago: Year Book Publishers, Inc. 1955.

Glaucoma: A Symposium organized by The Council for International Organizations of Medical Sciences, established under the joint auspices of UNESCO and WHO. Edited by Sir Stewart Duke-Elder. Pp. 350 + x, with illustrations. 37s. 6d. Oxford: Blackwell Scientific Publications. 1955.

The Diseases of Occupations. By Donald Hunter, M.D., F.R.C.P. Pp. 1046 + xv, with illustrations. £5 5s. 0d. London: English Universities Press Ltd. 1955.

The Medical Significance of Anxiety. By Richard L. Jenkins, M.D. Pp. 46. $1.00. Washington: The Biological Sciences Foundation Ltd. 1955.

The Human Brain. By John Pfeiffer. Pp. 266. 16s. London: Victor Gollancz Ltd. 1955.

Tea: A Symposium on the Pharmacology and the Physiologic and Psychologic Effects of Tea. By Henry J. Klaunberg, Ph.D., Editor. Pp. 63. Washington: The Biological Sciences Foundation Ltd. 1955.

Chronic Pancreatitis and Multiple Sclerosis. By E. P. Evans, M.R.C.S. Pp. 16. $1.00. Canada: Hignell Printing Ltd. 1955.

The Rural Hospital: Its Structure and Organization. By Dr. R. F. Bridgman. Pp. 162, with illustrations. Geneva: World Health Organization. 1955.

What Every Farmer Should Know About Income Tax. By David Shrand, M.Com., A.S.A.A., C.A. (S.A.). Pp. 50 + iii. Cape Town. Legal & Financial Publishing Company, 37 Burg Street. 1955.

PASSING EVENTS : IN DIE VERBYGAAN

Union Department of Health Bulletin: Report for the 7 days ended 4 August 1955.

Plague: Nil.

Smallpox: The case of smallpox reported in Bulletin No. 21 of 1955, should not be regarded as imported from Bechuanaland Protectorate.

Typhus Fever: Nil.

Epidemic Diseases in Other Countries:

Plague in Moulmein (Burma).

Cholera in Dum Dum, Visakhapatnam (India); Chalna (Pakistan).

Smallpox in Rangoon (Burma); Phnom-Penh (Cambodia); Ahmedabad, Bombay, Lucknow (India); Dacca, Lahore (Pakistan); Tourane (Viêt-Nam); Tanga (Tanganyika).

Typhus Fever in Kabul (Afghanistan).

* * *

The proposed reunion of the Witwatersrand University Students' Medical Council arranged for 26 August has been postponed to Friday 2 September because the original date coincided with the Annual Ball of the Southern Transvaal Branch of the Medical Association.

* * *

Dr. A. D. Keet (Jnr.), M.B., Ch.B.(Kaap), M.D.(Amst.), voorheen van die Departement Radiologie, Groote Schuur Hospitaal, het nou by dr. C. J. B. Muller aangesluit in sy radiologiese praktyk te Dumbarton-gebou 206, Kerkstraat, Kaapstad. Telefoon: Huis 3-6910, Kamers 3-4641.

* * *

Mr. C. D. Kisner, M.B., Ch.B., Ch.M. (Rand), Urologist to the Baragwanath and Coronation Hospitals for the last 5½ years, has, after a recent visit overseas, commenced practice as a Urologist at 7 Lister Buildings, Jeppe Street, Johannesburg. Telephone: 22–1453.

* * *

The South African Paediatric Association has awarded the 1955 Paediatric Prize to Mr. L. H. Opie, a medical student at the University of Cape Town, for his essay entitled: *The Pathogenesis, Signs and Symptoms, Treatment and Prognosis of Tuberculous Meningitis in Childhood.*

BOOK REVIEWS : BOEKRESENSIES

TUBERCULOSIS

Tuberculosis, Classification, Pathogenesis and Management. By Milosh Sekulich, M.D. Pp. 316+xiii. with diagrams. 50s. London: William Heinemann Medical Books Ltd. 1955.

Contents: 1. History of the Classification. 2. The Natural History of Primary Tuberculous Disease in Man. 3. The Natural History of Secondary Tuberculous Disease in Man. 4. Crucial Clinical Evidence in Favour of the Classification of Pulmonary Tuberculosis into Two Types—Primary and Secondary Tuberculous Disease. 5. The Classification and Diagnosis. 6. Localization, Evolution and Involution According to Type and Form of the Disease. A. Diagrammatic Study of 1,100 Chest Clinic Cases. 7. The Classification and Pathogenesis: Rich's Five Fundamental Factors of Influence in the Pathogenesis of Tuberculosis. 8. The Classification and Pathogenesis: Physiological and Accidental Factors in Individual Resistance. 9. The Classification and Pathology. 10. The Classification and Clinical work: Analysis of Diagnosis, Course and Management of 2,008 Chest Clinic Cases ended Quiescent and Classified according to Type and Form of the Disease with Definitions of each Form and Sub-Form. 11. The Classification in Relation to Superinfection and Relapse. 12. Non-Pulmonary Tuberculosis. 13. The Principles of Management and an Outline of Standardized Management. 14. A Minimum Basic Classification of Tuberculosis for Epidemiological Purposes. 15. Some General Conclusions. Appendix. Bibliography and References. Index and Notation of Diagnostic Terms.

The theme of this unusual book in to present a new classification of pulmonary tuberculosis. This classification is applied to the pathogenesis and pathology of the disease, and allows such a comprehensive diagnosis that treatment can be standardized. To bear this out, the analysis of 1,100 clinic cases and 500 post-mortem records, and the management of 2,008 clinic cases, are presented in a statistical and diagrammatic appraisal of the classification.

The classification into *primary and secondary types* is not new, and is pathologically and clinically accepted by all.

The Primary Type is subdivided into two forms: (1) An inflammatory or *benign* primary form, and (2) a caseous or *malignant* primary form. Both can produce a bacillaemia and serious complications (the malignant more often) but the essential difference is that the benign heals without, the malignant never without, antibiotic and chemotherapy.

The Secondary Type is also subdivided into two forms: (1) *A fibro-caseous form* in which the lesion is unilateral and spreads *via* the bronchial passages, and (2) *a fibrous form* which is always bilateral as a result of a localized chronic miliary tuberculosis.

These subdivisions are more difficult to accept and the further subdivisions suggested render the scheme complicated and impractical.

The book contains much valuable information, but certain omissions are unfortunate: (*a*) In pathogenesis, the author fails to refer to the importance of mechanical factors in causing irrevocable pulmonary damage such as atelectasis, bronchiectasis, etc., which often determine surgical treatment; and (*b*) reproductions of appropriate X-ray plates are entirely omitted.

Standardized treatment is a novel idea and the direct opposite of the intense individual assessment now considered essential. But then, the book is primarily intended for the Tuberculosis Officer who deals with records and statistics, and not for the clinician.

H.R.A.

DERMATOLOGY AND SYPHILOLOGY

The Year Book of Dermatology and Syphilology (1954—1955 *Year Book Series*). Edited by Marion B. Sulzberger, M.D. and Rudolf L. Baer, M.D. Pp. 472 with 59 illustrations. $6.00. Chicago: Year Book Publishers, Inc. 1955.

Contents: 1. Treatment and Prevention. 2. Eczematous Dermatitis, Atopic Dermatitis and Urticaria; Allergy. 3. Drug Eruptions. 4. Miscellaneous Dermatoses. 5. Cancers; Precanceroses; Other Tumours. 6. Fungous Infections. 7. Other Infections; Infestations. 8. Venereal Diseases and Their Treatment (Exclusive of Gonorrhea). 9. Investigative Studies. 10. Miscellaneous Topics.

This book keeps to the pattern of the previous year books of Dermatology and Syphilology. It is essentially a reference book, composed of summaries of the world literature on dermatology and syphilis. The editors, well known American dermatologists, have

carefully selected their articles, with the result that one is presented with a fine assortment of articles with something to interest most doctors, be they dermatologists, general practitioners, radiologists, physiologists or laboratory workers. At the end of most articles, the editors give their own opinion on the article, pointing out any fallacies in experimental work and giving their own experiences on therapy. I find their opinions particularly interesting and informative; and one of the outstanding features of the book.

There are some rather good photographs of molluscum sebaceum which should prove of value to the surgeon and radiotherapist not conversant with these tumours. There is a wealth of information in this book ranging from such topics as the isolation of the melanophore-stimulating hormone of the pituitary to the use of ACTH in the treatment of pellagra. This is not a book that can be read like a novel but is an excellent reference book that should be available in every medical library.

H.K.

ENDOCRINOLOGY

Ciba Foundation Colloquia on Endocrinology. Volume VIII The Human Adrenal Cortex. Edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., B.Ch., Margaret P. Cameron, M.A., A.B.L.S. and Joan Etherington. Pp. 665 + xv with 227 illustrations. 55s. London: J. & A. Churchill Ltd. 1955.

Contents: Part I. 1. Aspects of the Histochemistry of the Adrenal Cortex. 2. Some Observations on the Problem of Cortical Zoning. 3. Mitotic Activity in the Adrenal Cortex, Studied in the Rat. 4. Cellular-Vascular Relationships in the Adrenal Cortex, as Studied in the Rat. 5. Studies on the Anatomy of the Human Adrenal Cortex in Various Functional States. 6. The Reaction of the Adrenal Cortex in Conditions of Stress. 7. The Adrenal and Famine. 8. The Synthesis of Corticosteroids by the Human Adrenal Cortex. 9. Adrenocortical Steriods in Humans: Metabolism and Generalizations. 10. Adrenocortical Function and Plasma 17-Ketosteroids in Man. 11. Gradient Elution Chromatography of Corticosteroids in Human Blood. 12. The Biosynthesis of Aldosterone (Electrocortin) in the Adrenal. 13. The Excretion of Sodium-Retaining Substances in Human Beings. 14. The Possible Role of Electrocortin in Normal Human Metabolism. 15. Biological Studies with Aldosterone (Electrocortin). 16. Medullary-Cortical Relationships in the Adrenal. 17. The Effect of Epinephrine on the Metabolism of 17-Hydroxy-corticosteroids in the Human. 18. Relationships Between Cortical Hormones and the Catechol Amine Output in Urine. *Part II.* 19. Chairman's Opening Remarks. 20. Dynamics of Adrenal Function in Man. 21. Variability of Adrenocortical Response to ACTH in Different Persons, and the Influence of Variations in Administration of ACTH Preparations on the Level of 17-Hydroxycorticosteroids in the Blood. 22. Studies of the Inter-Relationship Between the Adrenal Cortex and Ascorbic Acid Metabolism. 23. Studies on the Sodium-Retaining Effect of Adrenal Cortical Steroids. 24. Clinical and Metabolic Effects of Aldosterone. 25. The Na and K Concentration in Mixed Saliva: Influence of Secretion Rate, Stimulation, Method of Collection, Age, Sex, Time of Day and Adrenocortical Activity. 26. An Attempt to Correlate the Histological Changes in the Anterior Hypophysis and Adrenal Glands in Various Diseases in Man. 27. Metabolic Effects of Adrenalectomy in Man. 28. Therapeutic Results of Hypophysectomy in Metastatic Carcinoma of the Breast and in Severe Diabetes Mellitus: Adrenocortical Function after Hypophysectomy. 29. Virilizing Adrenal Hyperplasia: Its Treatment with Cortisone and the Nature of the Steroid Abnormalities. 30. Cushing's Syndrome. 31. Cushing's Syndrome (continued). 32. The Reciprocal Relationship Between the Thyroid and Adrenocortical Responses to Stress. 33. The Possible Functional Significance of the Pituitary-Portal Vessels. 34. Psychological Responses to the Administration of ACTH and Cortisone. 35. Physiological Response of the Adrenal to Psychological Influences as Indicated by Changes in the 17-Hydroxy-corticosteroid Excretion Pattern. 36. Adrenocortical Function of Combat Infantrymen in Korea. 37. General Discussion. 38. Chairman's Closing Remarks. Subject Index.

The most recent volume of the Ciba Colloquia concerns itself with the human adrenal cortex. As usual, the text consists of the papers read at this colloquium, followed by verbatim reports of the ensuing discussions. Since these meetings were attended by most of the prominent British endocrinologists and by a fair representation of visiting specialists, it will be realized that the discussions form one of the most valuable contributions of the volume.

The volume is divided into 2 parts, the 1st of which deals with histological and biochemical aspects, and the relationship between the adrenal cortex and medulla; the 2nd half covers the physiology and pathology of the gland, and its relationships to the pituitary. Thus, most of the major aspects are embraced.

The earlier part of the volume will be of most value to the physiologist, biochemist and pathologist, but several papers are of more general clinical interest, e.g. those that deal with some of the recent work on aldosterone (Electrocortin). In Part II several significant papers appear. Aldosterone receives more attention. There are papers on therapeutic adrenalectomies and hypophysectomy; these operations have been performed for widespread metastases from breast carcinoma, and for the severe, malignant, vascular complications of diabetes, and, whilst the full results cannot be assessed as yet, the work shows considerable promise. Other excellent papers in the latter half cover virilization due to adrenal hyperplasia, and Cushing's syndrome. These two subjects warrant attention in view of modern surgical techniques.

Once again, Ciba have rendered a valuable service by allowing a free interchange of ideas among these notable scientists, and by collating so much information. To those of us who cannot participate in these meetings, this prompt reporting of the procedures is a welcome substitute.

This volume is not directed towards the general practitioner nor even, for that matter, towards the general physician. However, it forms essential reading for those who wish to keep up-to-date in the latest endocrinological developments. We look forward with interest to further publications from this source. R.H.

DOCTOR AGAINST WITCHDOCTOR

Doctor against Witchdoctor. By E. W. Doell. Pp. 216 with illustrations. 15s. London: Christopher Johnson Publishers Ltd. 1955.

Contents: 1. The Country, The People and the Hospital. 2. An Ordinary working day. 3. Motswane. 4. Doctor. Doubly Qualified. 5. Journey's End. 6. Aniti. 7. Chipika and the Hospital. 8. The Other Twin. 9. Gotasana. 10. Choko. 11. Sibande, or The Evil Stone. 12. Sunshine the Bushman. Epilogue.

The author tells of a doctor's struggle to break the powerful influence of the African witchdoctor. He feels anger, frustration and grief when his efforts to repair damage caused by these men end in disappointment.

We read of the tragic death of the child Motswane. The parents' stubbornness angers the doctor. Later, when he is able to operate successfully, the child is abducted and all his work is undone by interfering relatives. The frightened mother calls the doctor, but it is already too late.

Aniti, another victim of stubbornness, bleeds to death from a lung. An inguinal hernia, and treatment by a witchdoctor, nearly end Boyeyana, and his prospects of marriage, but the doctor saves him and all is well.

Not all the incidents, however, are sad and the pleasanter ones compensate for the tragedies. There is the amusing story of Chipika, who finds that hospital and kraal life are vastly different. Gotasana, unable to have children, is treated by the doctor, and eventually has triplets. A present of a lion's skin, is given by a grateful ex-patient, whose artificial leg saves him from the jaws of the beast. Another triumph for the doctor, is the courageous Sibande, who defies the witchdoctor and comes into hospital. Sunshine, the cripple Bushman, repays his debt, by helping the doctor, when he is stranded in the desert.

Recounting these incidents, the doctor feels that Scientific Medicine must eventually triumph over Witchcraft. R.B.T.

ANTIBIOTICS ANNUAL

Antibiotics Annual 1954-1955. *Proceedings of the Second Annua Symposium on Antibiotics.* Edited by Henry Welch, Ph.D., and Félix Marti-Ibánez, M.D. Pp. 1154 + ix with illustrations. Consisting of 170 individual articles, each by a different author or authors. New York: Medical Encyclopedia, Inc. 1955.

The International Symposium on Antibiotics of 1954, sponsored by the U.S. Department of Health and of Food and Drug Administration, has left this encyclopaedic volume as proof of its activities. The summary is introduced as follows:

'The Second Annual Symposium on Antibiotics has defined the immense scope of the effects of antibiotics on modern clinical medicine, has given confirmation of the scores of diseases which are today being effectively controlled, has offered us a glimpse of the promise of antibiotics in fields other than human medicine, and has presented new testimony of the basic safety of this revolutionary approach to infection. This Symposium has also opened new perspectives in relation to synergism between individual antibiotics and between antibiotics and hormones. Further it was demonstrated that all antibiotic investigators refuse to rest on their laurels; they are pressing forward in their relentless search for new antibiotics. Fourteen new antibiotics were reported at this Symposium. No brief summing-up can give an adequate idea of the scientific importance of the contributions made in this Symposium.' The reviewer finds himself in wholehearted agreement with this closing statement.

Amongst the introductory talks the very readable and educative exposition by the co-editor Marti-Ibánez on 'Philosophical Impact

of Antibiotics on Clinical Medicine' deserves special comment.

One can only briefly indicate the following highlights of applications and trends in the wealth of clinical and experimental evidence. Apparently more than half the prescriptions written today in the U.S.A. are for antibiotics, so that the safety factor has become increasingly important. Experience warmly confirms the wide margin of safety present for most antibiotics. Known usefulness has been adequately tested and confirmed. Extension of usefulness is leading to their application as growth-promoting factors both for animals and plants, as tumour-suppressing substances, and against fungi. Intensive studies with various combinations are continuing in the expectation that synergistic effects could further enhance their usefulness. Antibiotics are also increasingly being combined with hormones and effecting better results, particularly in chronic or resistant infections.

New antibiotics announced are flagecidin, PA-105, pleomycin, fungichromin, fungichromatin, etamycin, puromycin, griseoviridin, viridogrisein, celesticetin, spiramycin, actinomycin C and D, and fungicidin. Would-be readers could profit by perusing the useful summary before selecting their particular field of interest.

This documentation of clinical and experimental research-work is of a high standard and because of its multifaceted character does not make easy reading. It is particularly recommended for the specialist in clinical medicine and the research worker. In addition to the complete list of titles and authors the volume is also supplied with a comprehensive index for reference purposes. These qualities with the fact that paper, print and bind are excellent, make of it a top-notch reference book in a rapidly developing field with wide horizons.

H.W.S.

CORRESPONDENCE : BRIEWERUBRIEK

CIRCUMCISION AND CARCINOMA

To the Editor: I was interested in the literature on the relationship between circumcision and the incidence of carcinoma of the penis.

During 6 years of practice amongst the Hottentots of South West Africa I found that epithelioma of the penis was the most common malignant tumour amongst male Hottentots. The Hottentots do not practise circumcision and a rather tight and elongated prepuce appears to be a racial characteristic. In addition their hygienic standards are of an exceptionally low order.

J. Helman

4 Joubert Street
Vasco, Cape
10 August 1955

TEST FOR CANCER: A SUGGESTION

To the Editor: With a steadily increasing life-span, a reliable test for incipient cancer becomes more imperative every day. For some reason or other, in spite of the great advance in scientific knowledge, such a test is still hidden from us. Now and again somebody comes forward with a new test, soon to be relegated to the laboratory dustbin when found to be ineffective.

A test for the early detection of cancer is therefore still anybody's guess. I feel therefore that I also have the right to broach an idea I have had for some time, which I think is a new approach to the problem.

I refer to the highly developed olfactory sense in certain insects and animals who have a predilection for blood. I assume of course that there is a subtle difference between the blood of people who suffer from cancer and of those who do not.

It should not be difficult to condition such insects or animals to develop a marked and distinct preference for the blood of people who suffer from cancer. The test insect or animal would then elect to feed on the blood under test instead of the control, if the specific elements of incipient cancer are present in the former.

This idea of mine is merely a 'hunch' but there is not much difference between an hypothesis and a good guess.

Doc Labourer

5 August 1955

REVISION SERIES XIV. THE PRESENT-DAY TREATMENT OF THE VENEREAL DISEASES

To the Editor: Dr. O'Malley's excellent article featuring in the *Journal* of 30 July should prove most helpful to those who see only occasional cases of venereal diseases. However, there are points of disagreement which, I feel, should be raised:

1. In the section on the treatment of gonorrhoea, the danger in masking an underlying syphilis is *underrated*. I have seen many cases of syphilis with extended incubation periods (if the histories are to be believed) attributable to casual doses of penicillin and other treponemicidal antibiotics. For this reason I maintain that surveillance should continue for 6 months after the last dose of an antibiotic. This point is endorsed by the author in the section (*h*) *Prophylaxis of Syphilis*.

2. Referring to (*c*) *Late and Latent Syphilis*, inference is made that the *Treponema pallidum* immobilization test is specific for syphilis. Unfortunately this is not so as positive reactions have been reported with other treponemal conditions. I draw attention to this in the hope that a similar 'unholy reliance' will not be placed in this test to that which has been vested in the Wassermann and other non specific tests.

3. It is appreciated that this type of article must be 'condensed', but it is unfortunate that there was only brief reference to serological *false positive reactions* and *titres*. Elucidation of these points would have assisted greatly (*a*) in preventing the labelling of all positive reactions as syphilitics and (*b*) in the appreciation of 'qualitative' and 'quantitative' tests.

4. While on the subject of *persistence of urethral discharges*, emphasis might have been placed on *re-investigation* before deciding on the lines of further treatment. Such re-investigation should include smears, dark-ground examinations, cultures (aerobic and anaerobic), sensitivity tests etc.

R. S. Dewar

17 Roehampton Way
Durban North
4 August 1955

1. O'Malley, C. K. (1955): S. Afr. Med. J., **29**, 725.

ARTIFICIAL INSEMINATION

To the Editor: It is quite true, as Dr. Freed says in his letter of 9 July, that the courts have interpreted the legal consequences of artificial insemination by donor (AID) in some paradoxical ways, but, under normal circumstances, these problems are extremely unlikely to arise, and it would be doing a great injustice to many couples to deny them this means of parenthood because of the remote possibility of legal complications in divorce proceedings.

The legal position is that, until the contrary is proved as a result of a court action, the husband is always assumed to be the father of his wife's children. This is very applicable in these cases.

As long as the couple are living together and having sexual intercourse, and as long as it is known that he has at least a few viable sperms, then it would be difficult to prove that the AID baby was not the husband's, especially if the donor were of the same blood group.

The question of the husband seeking divorce on the grounds of adultery, the evidence for which is based solely on his own infertility, would similarly be difficult. The wife would be under no obligation to produce evidence of her child's blood group which might be to her own prejudice.

Just as every man is presumed innocent until proved guilty, so, similarly, every child born to a married woman is presumed legitimate unless the contrary is proved, and in these cases the court is likely to make no ruling that would prejudice the child's legal standing unless compelled to do so by very glaring evidence.

From a psychological point of view, also, it is highly desirable that, if possible, the couple should continue intercourse during AID. They can then always say to themselves that perhaps, this time, one of the husband's sperms at last did its duty after all. And who is to say that it didn't?

Medico-legal

8 August 1955